TECHNOLOGY DEPT.

First Copy

"A National Newspaper for Every Branch of the Industry"

Automotive Daily News

PASSENGER TRUCK PARTS, SHOP EQUIPMENT TIRES ACCESSORIES

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MOTOR STOCKS HIT NEW PRICE LEVELS FOR 1928

Gains by Passenger Cars and Tires Is Big Factor

By CONRAD J. ALEXANDER

NEW YORK, Nov. 24.—Automotive stock averages advanced all along the line in this week's active trading on the New York Stock Exchange and Curb Market.

While the automotive list as a whole did not react to the general bull market nearly as strongly as it did in other busy markets of recent months, several individual issues sprang into prominence with substantial gains, nearing the sensational in a few cases.

Not a few losses will be noted for the week in the tabulation of the movement of the automotive stocks, but these are offset by such gains as that made by Stromberg Carburetor, which advanced 22¼ points in the five days' trading.

So heavy was the trading during the week that orders were issued Friday closing both the New York Exchange and the Curb Market Saturday, thus resuming a practice instituted last spring when the brokerage houses were overwhelmed with transactions.

The average price of the sixty stocks used in the Automotive Daily News compilation as shown in the box accompanying this story this week went to a new high mark for the entire year. The advance for the week was 1.08 points and this figure, which prevailed at the closing of the market

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DENIES CHRYSLER BUYING COMMERCIAL CREDIT CO.

Baltimore, Nov. 24.—A. E. Duncan, chairman of the board of directors of Commercial Credit Company, denies that Chrysler Corporation has either purchased or is negotiating for the purchase of control of Commercial Credit Company.

He said the Commercial Credit Company has for years enjoyed close relations with Chrysler Corporation in connection with the retail financing of the Chrysler product and expects to have these plans include the product of Dodge Brothers, recently acquired by Chrysler.

G. M. Overseas Car Sales 210,290 Units In First 9 Months

New York, Nov. 24.—During the first nine months of this year General Motors sales of cars to overseas dealers amounted to 210,290, which exceeded any previous complete year's figure. This total of 210,290 in the nine months ended September 30 compares with 193,830 in the nine year 1927, and is almost as great as the combined volume for the years 1926 and 1925, which amounted to 219,685 units. Sales in the third quarter of this year exceeded those of the same quarter of 1927 by 23,935, or 49 per cent.

SIEGER SPRINGS S. A. E. SENSATION

Extra Paper on Carboloy Tells Remarkable Results

By WALTER BOYNTON

Detroit, Mich., Nov. 24.—Friday night brought to a successful close the production meeting of the Society of Automotive Engineers, which attracted a record attendance and presented a two-day program of technical papers and discussions. Between 725 and 750 members of the society were present, representing all sections of the country.

Sessions of Friday's program followed strictly the printed schedule, to which an extra paper on "Carboloy and Its Possibilities" was added. This was read at the evening session by G. H. Sieger of the Carboloy Company, a General Electric subsidiary, and it proved one of the sensations of the meeting.

There was a comparatively small audience at the opening session Friday, but this was swelled by latecomers, until by the time it was

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MAY OFFER PRES. COOLIDGE PRESIDENCY OF A. P. I.

New York, Nov. 24.—Officials in oil industry are reported to be starting a move to offer presidency of American Petroleum Institute to President Coolidge at institute's annual meeting in Chicago December 3 to 6.

LARGER OUTPUT FOR CLEVELAND PLANTS PLANNED

276 Manufacturers to Expand Units for 1929 Demand

By HAROLD G. McCOY

CLEVELAND, Nov. 24.—The predicted record production in the automotive industry for 1929, to get under way with the production of new models to be revealed at the automobile shows, is already having its effect upon the 276 automotive plants in Cleveland.

High production, in some cases record employment, and a general expansion among these plants is reported in the October survey of the industry, made public today by Earle Martin, industrial development commissioner of the Cleveland Chamber of Commerce.

Among the new industries is the Wasmer Bolt and Nut Company, organized by John C. Wasmer, M. J. O'Donnell and W. G. Uhler, with $125,000 capital. It has taken over 11,000 square feet of space in the Bramley Storage and Power building and plans to be in production about January 1, equipped with modern machinery to turn out a standard line.

Construction is under way of a new $100,000 factory of the Precision Castings Company, removed here from Syracuse, N. Y. The plant will manufacture aluminum die castings. Some 250 workers will be employed. The plant will be equipped to manufacture some of the largest aluminum castings known.

W. S. Tyrler Company, manufacturers of automobile pressed steel

(Continued on page 5)

HUPMOBILE BUYS CONTROL OF CHANDLER-CLEVELAND

$97,000,000 Amalgamation Seen as Former Acquires Stock in Open Market; Conference Held in Detroit

NEW YORK, Nov. 24.—The Chandler-Cleveland Motors Corporation, largest Cleveland automobile manufacturer, has passed to control of the Hupp Motor Car Corporation, Detroit.

President DuBois Young of Hupmobile said this morning in Detroit that no details of the merger with Chandler were available, pending the outcome of a conference to be held in Detroit today.

DuBois Young

Confirmation of reports that Hupp had bought control of Chandler-Cleveland in the open market was obtained from an official of the latter company in Cleveland.

This official, who refused to be quoted, admitted the report was "substantially correct." Purchase of control of the Cleveland concern, which has several subsidiaries, is reported to have been made over a period of several months in the open market. During this period Chandler stocks have risen sharply but not materially out of line with other sharp rises during the recent bull market.

Merger of Hupmobile and Chandler-Cleveland will result in a $97,000,000 amalgamation, based on prices of the stocks of the two companies at the close of the New York Stock Exchange for the week last night. There are outstanding 350,000 shares of Chandler-Cleveland preference stock, which closed at 29¾, and 280,000 shares of common, which closed at 23, giving a total market valuation of $16,852,500. There are outstanding 1,082,479 shares of Hupp, which closed last night at 74, giv-

(Continued on Page 5)

Automobile Dealers Looking Forward to New Year's Business

Special from A. D. N. Detroit Bureau

Detroit, Nov. 24.—Automobile dealers are grumbling and showing signs of impatience for the opening of 1929 and its promised flood of business. The retail men generally report that business is very quiet, following a spurt as the result of individual price reductions at the branches of important manufacturers here.

New cars are moving rather slowly, and the bulk of sales is being completed as the result of filling back orders. Deliveries from the plants are being speeded up and the situation is marked by quietude otherwise.

Stocks are being slowly reduced, with the prospect of fairly clean shelves by the end of next month, when things ought to brighten very materially. The used car market

(Continued on Page 11)

AUBURN PLACES ORDER FOR 7,000 BODIES

Chicago, Nov. 24.—Auburn Automobile Company has placed orders with Central Manufacturing Company for 7,000 bodies, to be delivered within four months.

Up to the Law Makers

Uniform Vehicle Code Before 41 States In January

Washington Nov. 24.—Legislatures of forty-one states in January will consider adoption of the Uniform Vehicle Code and, in states where the code has been only partially adopted, will consider additional provisions with the idea of having a uniform code throughout the United States.

Adoption of the uniform code for all states and the Model Municipal Traffic Ordinance for cities—both large and small—will be vigorously urged during the coming winter by all organized automotive bodies, the American Motorists' Association, through its legislative committee, having this week started the ball rolling.

Each of the two pieces of legislation is the outgrowth of the National Conference on Highway Safety, of which President-elect Hoover was chairman.

Success of the uniform vehicle code is evidenced by the fact that already nineteen states and the District of Columbia have partially adopted it.

They are New Jersey, Massachu-

(Continued on page 2)

Safety-Responsibility Law for Banning Recklessness

Washington, D. C., Nov. 24.—After several years of exhaustive investigation, the American Automobile Association has sponsored basic principles to be embodied into a safety-responsibility law capable of nation-wide adaptation.

The principles underlying the proposed A. A. A. safety-responsibility law were announced today after a committee of seventeen, representative of the motorists of the entire country, had submitted an exhaustive report, coupled with recommendations to the executive committee of the national motoring body.

The report of the committee covered an investigation in every section of the country, as well as an analysis of all proposed and attempted solutions of the problem presented by the reckless driver and the relation of this problem to the question of financial responsibility for damages incurred. Compulsory automobile liability insurance was definitely discarded.

"With forty - two legislatures

(Continued on page 2)

New and More Powerful Pontiac Models to Be Announced Shortly

Special from A. D. N. Detroit Bureau

Detroit, Nov. 24.—A Pontiac Six, new in practically everything but the name, will be introduced shortly by the Oakland Motor Car Company.

The new car will be larger, more powerful and more luxurious, and the price, according to the Oakland Company, will bring a large six within the price range of a small six.

Production of parts for the new line is in progress at the expanded plant of the company at Pontiac. It will be built almost entirely by the company plants and in that of the Fisher Body Corporation.

The Oakland-Pontiac plants are now equipped to produce a total of more than 350,000 cars of both lines in 1929. The present year's production of Pontiacs alone is estimated at close to 270,000, a 40 per cent. increase over the 1927 figures.

FIRST CHEVROLET SIX SHOWINGS IN NEW YORK

New York, Nov. 24.—Chevrolet Six advance showings of seven-passenger car models and three commercial types opened today, and will continue until midnight November 29 at the Waldorf-Astoria Hotel and the Chevrolet retail sales rooms on Broadway at 62d Street.

The showings were conducted in customary automobile show style, despite the fact that tickets were not necessary, there being no admission charge. There were musical programs at both showings. Motion pictures of General Motors proving ground were shown also.

UNIVERSAL TERMINALS CO. $8,000,000 PROJECT WILL AID DRIVEAWAY OF CARS

Cleveland, Nov. 24.—A new $500,000 pier and a $7,500,000 warehouse for the Universal Terminals Company, a business ally of the Nicholson-Universal Steamship Company, is to be built here at once on lakefront land at the foot of East 55th Street. City Council is ready to approve a grant for the waterfront construction.

The terminal will supersede the present equipment of the Nicholson-Universal Company, which during the season of 1928 is reported to have ferried 70,000 automobiles from Detroit to Cleveland for driveaway distribution here throughout the East.

Representatives of the company at a hearing before City Council informed member sthat the company planned to ferry at least 150,000 cars over the same route the next year. Dealers employing this method of obtaining deliveries from Michigan factories are reported to have saved $15,000,000 to $20,000,000 over cost of rail or other forms of delivery.

The present pier of the Nicholson-Universal Company at foot of East 40th Street proved inadequate to accommodate the company's heavy automobile cargoes during the last two months of the lake shipping season.

Automotive Stocks at New 1928 Price Levels

(Continued from Page 1)

Friday, was .08 above the previous high mark for 1928, made in the week ended October 13.

This comparison is in itself sufficient to show that the upward movement of automotive stocks in the so-called Hoover bull market has not kept pace with some of the industrials that have acted sensationally. But it will be recalled that during the strong markets of the spring and summer the advance by the automotives was generally ahead of the industrial market as a whole.

This week each of the four automotive groups advanced, whereas in the previous week only the passenger car and rubber groups went ahead. Perhaps the action of these groups in going ahead last week while the accessories and trucks were lagging was a forecast of the fact that this week the passenger car and rubber divisions were to lead the advance.

Passenger Cars

When the percentage of gain is considered the Chandler-Cleveland Company's stock lead this group this week, with a gain of 4⅜ points to 23. The high for the week in this issue was 24, reached yesterday. Of course reports that the Hupp Motor Car Company had obtained control of Chandler by purchase of its stock was the immediate cause of the advance.

Nash sprang into the limelight again with an 8-point advance into new high ground for the year. It touched 106⅞ and closed at 105.

Stutz continued to reach new heights for 1928 and closed at 41, for a net gain of 5 points, after having set a new top at 48½.

Marmon, in which good buying has been in evidence for several weeks, went steadily forward to a new high at 79½ and closed at 76¼ for a net gain of 5⅜.

Aided by these gains, the passenger car group of stocks set a new average price for the year at 58.59. This is a gain of 1.08 over the previous high of 57.51, which was made in the week ended November 17.

Accessories

Stromberg Carburetor's jump of 22¼ points to 87½ was the feature of this group of automotive stocks. The stock closed the week strong, only ½ point below the high of 88, which was the top for 1928.

Eaton Axle and Spring was another accessory stock that gave a good account of itself in the week's trading. It advanced from 58 to 66⅜ for a net gain of 8⅜ points. The high point reached both for the week and year was 68⅛.

Despite these and other smaller gains, the accessory group made a gain of only .91 for the week, due to losses in a number of the stocks in this division. Among the stocks that made good gains recently and failed to go ahead in the past week were Briggs, Electric Auto-Lite, Electric Storage Battery, Kelsey-Hayes Wheel, Murray Body, Stewart-Warner, Timken Roller Bearing and Mullins Manufacturing. All of these sustained losses.

The accessory group average stood at 71.41 at the close of the week. This is but .63 of a point below the high average for the year, 72.04, which was reached in the week ended October 13.

Rubbers

The splendid action of Goodyear accounted for most of the gain in average price made this week by the rubber group. The average stood at 53.07 at Friday's close, a gain of 1.79 for the week and placing it within striking distance of its high for the year.

Trucks

The truck group at 43.25 is only .10 below the high mark of the year, which was 43.35, having been set in the week ended October 20. Mack Trucks and Brockway, the usual leaders in this group, went opposite directions this week. Mack gained 1⅝ and Brockway sank 4 points, after having gone forward steadily for several weeks.

AUTOMOTIVE DAILY NEWS STOCK AVERAGES

	Nov. 17.	Nov. 23.	Net Ch'ge.
60 Automotives..	$58.31	$59.39	+ $1.08
20 Pass. cars ..	57.51	58.59	+ 1.08
20 Accessories ..	70.50	71.41	+ .91
10 Rubbers	51.28	53.07	+ 1.79
10 Trucks	42.45	43.25	+ .80
50 Industrials ..	153.00	158.00	+ 5.00

ACTIVE STOCKS

	Low.	High.	Net Ch'ge.
Gen. Motors (old)...	212⅞	214⅛	+ 1⅝
Gen. Motors (new)..	87	87½	+ ½
Nash	97	105	+ 8
Marmon	70½	76¼	+ 5⅜
Eaton Axle	58	66⅜	+ 8⅜
Stromberg Carb. ..	65¼	87½	+ 22¼
Goodyear	83½	94⅝	+ 10⅞

Canadian Section S. A. E. at Toronto Elects Officers

Toronto, Ont., Nov. 24 (U. T. P. S.).—At a meeting held in Toronto, members of the Society of Automotive Engineers, residents in Canada, decided that they would form a Canadian section of the association. Sixty members attended the meeting.

Officers elected by the newly formed Canadian section were: President, R. H. Coombs, president of the Prest-o-Lite Company of Canada; vice-presidents, A. S. McArthur, general superintendent of the Toronto Transportation Commission, and Roy D. Kerby of the Durant Motors of Canada, Ltd.; secretary - treasurer, Warren Hastings. These will comprise an organization committee. Those addressing the meeting included T. A. Russell, president of the Willys-Overland Company of Canada, and Alex N. Bently, general manager of the Exide Batteries Company of Canada.

FIRESTONE RADIO HOUR TO BE RELAYED ABROAD

Akron, O., Nov. 24.—A series of weekly radio programs through the forty-one stations of the National Broadcasting Company will be broadcast by Firestone Tire and Rubber Company, starting December 3, officials have announced.

Station WGY at Schenectady will relay the program to England, France, Germany, the Liberian plantations of Firestone and other foreign countries.

The series will go on at 8 o'clock Akron time and last a half hour. The entertainment will be called the "Voice of Firestone."

PLAN PARAMOUNT TAXICAB DISTRIBUTION NATIONALLY

New York, Nov. 24.—As a result of the successful introduction of Paramount taxicabs here, it is announced that national distribution will be undertaken soon. Plans have been developed for the distribution of Paramount cabs in large cities of the country. This will increase the number of cars the factory will be compelled to produce to meet the increased demand.

SPARKS from DETROIT

"Armenian" Cars

* * *

New Chevrolet Building

* * *

"Demon Driver"

* * *

Eldridge Anecdote

Walter Boynton—Detroit Editor

A HEADLINE in one of our justly esteemed New York contemporaries says: "Great Britain Demands More Armenian Cars." This is possibly a misprint for "Armorican," or, just possibly, "American." America probably making more cars than either Armenia or Armorica. The latter country has been out of business since Caesar's time and the Armenian product is still rather negligible, since it amounts to zero.

A distinguished automotive writer and expert, calling attention to this slip, writes: "Wonderful people, these Armenians." I concur.

* * *

As an additional deterrent to speeding in Detroit, let it be recorded that the jail is under quarantine for diphtheria. This makes it even more difficult to leave than it is under normal circumstances. The man who goes to jail now may have to stay even after his term has expired. Verbum sap!

* * *

A NEW BUILDING for Chevrolet, to cost $225,000, is to be erected at Flint. It will be one story high, and 208 feet along the Grand Trunk track, with a depth of 314 feet, and will provide additional shipping facilities, which officials say are sure to be badly needed by the time the new building is ready for use.

* * *

D. D. Stone, motor engineer for Buick, was the chief speaker at the November meeting in Flint of the General Motors Institute of Technology branch of the Society of Automotive Engineers. His subject was: "Trends in Motor Design," covering some of the features of the silver anniversary power plant and detailing some of the processes involved in the development of a new engine.

* * *

COL. J. G. VINCENT of Packard, whose military rank was conferred on him for distinguished service in helping to design and develop the Liberty airplane engine, began life as a bookkeeper for a commission house in St. Louis. He admits now that he never did like bookkeeping and he gave up that fascinating occupation to become a machinist's helper. His inventive talent later was devoted to the experimental work of the Burroughs' Adding Machine Company, at that time located in the Missouri city, when Alvan Macauley, the present Packard head, was with the adding machine company. When the Boyer outfit moved to Detroit, Mr. Macauley and the present colonel came along with the other executives.

When Mr. Macauley joined Packard, Col. Vincent went to the Hudson Motor Car Company as its chief engineer and in 1912 followed his old chief to Packard, where he is now vice-president in charge of engineering.

Incidentally, and for professional purposes, Col. Vincent has an earned reputation as a "demon driver." Packard has what is regarded as the fastest speedway in the country, for testing purposes, and the vice-president in charge of engineering takes the turns at a racing clip. Like most men who drive fast in connection with their work, he feels that fifty miles an hour ought to be about the limit for the average man on the roads. When he is testing a car, he naturally likes to satisfy himself as to its top speed, and he travels part of the time at 100 miles an hour, or so.

* * *

In this connection, it is recalled that when Henry B. Joy was president of Packard, he used to have a characteristic order to the men who were testing a new car. Mr. Joy's instructions were: "Take it out, and break it." Some of the earlier tests were crude but effective, in that they put the cars over the toughest going that an earnest seeker for bad roads could locate. Sometimes the cars were actually broken. Then they were taken into the factory, the broken parts redesigned, and the revamped car sent out over the same road. This was probably tough on the tester, but it certainly was a definite way of building up car stamina.

* * *

Here is another anecdote of Clarence Eldridge, the Reo sales chief. Once when he was umpiring a very hard fought game of baseball at Jackson, where feeling was well over the boiling point, he called one of the Jackson nine out at the plate. Some of the fans did not take kindly to the decision, and they descended on Mr. Eldridge, with the design of talking to him about it. They came in such earnest, and in such numbers, that they destroyed part of a grandstand in getting out of it, and at least one fan got a leg broken in the rush. When they got to the field, Mr. Eldridge was strangely missing. His earlier athletic training had included a course in the sprints, and by the time the debaters had got to where he had been a moment before, he was just approaching Kalamazoo. Let it be recorded that he was back on duty the next day, and that the fans, either because of his proved courage or his proved ability to cover ground, let his decisions ride without resorting to mass argument.

* * *

December 20 has been set as the date on which all of the property of the Michigan Electric Company, trolley operators in the state, will be offered for sale by the master in chancery of the Federal Court. Suit by two trust companies, to recover under a mortgage given in 1919, has brought the company's difficulties to a head.

HARRISBURG SHOW TO BE HELD FEBRUARY 2 TO 9

Harrisburg, Pa., Nov. 24. — The nineteenth annual Automobile Show of the Harrisburg Automotive Trade Association will be held February 2 to 9, according to an announcement by L. G. M[illegible] manager.

Uniform Traffic Code Coming Up In Legislatures

(Continued from Page 1)

setts, Rhode Island, Connecticut, New York, Pennsylvania, Maryland, Virginia, California, New Hampshire, North Carolina, Michigan, Minnesota, North Dakota, Arkansas, Idaho, Arizona, Washington, Oregon and the District of Columbia.

New Jersey is the first state to report a 100 per cent. uniformity in its traffic code, every regulation, signal and marker, pertaining to traffic, in city or country, being uniform.

The uniform code became effective throughout New Jersey on September 1 and already its operation has met with favorable comment by motorists of that state, and by visiting motorist reports to the association indicated.

Commenting on the proposed adoption by all states and cities respectively of the new state and city model codes, Thomas J. Keefe, general manager of the A. M. A., declared that reasonable regulations so designed will command respect and be to a large extent self-enforcing.

On the other hand, he pointed out, ureasonable or unduly restrictive measures arouse resentment and invite disobedience and cannot be enforced by an army of traffic officers.

Law Would Ban Reckless Driver

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scheduled to meet within the next few months, and with the failure of the Massachusetts compulsory liability insurance law now generally conceded, the time is most opportune to put forward the basis for a sane measure to curb the reckless driver and to promote payment of legally secured judgments," Thomas P. Henry, president of the A. A. A., declared.

"While not in any sense intended as a panacea, the principles underlying our safety-responsibility proposal afford the foundation on which to build a structure of protection which may well revolutionize the face of motordom, and it is our hope to place all our resources and those of more than 1,000 A. A. A. clubs behind it in immediate years ahead."

Parts and Accessory Trade Reports Best Fourth Quarter

NEW YORK, Nov. 24.—The automotive parts and accessory business is enjoying the greatest fourth quarter the industry has ever had and will close 1928 with new high records in production and sales, according to the Motor and Accessory Manufacturers' Association.

In October, suppliers of original equipment to the motor vehicle makers, and replacement parts and garage equipment to the trade, did virtually the same heavy volume of business that they had in September, and during the first half of this month maintained operations only a little below the October level.

The grand index of shipments to the car and truck manufacturers and the wholesale trade by a large and representative group of M. & A. M. A. members in October were 188 per cent. of the January, 1925, figure, compared with 202 per cent. in September, 212 per cent. in August and 129 per cent. in October a year ago. Since last March, when the index for all divisions first reached 200 per cent. operations have not declined below an index figure of 187 per cent. for any month.

Business of original equipment makers in October was 200 per cent. of January, 1925, as compared with 218 per cent. in September, 230 per cent. in August, and 124 per cent. in October a year ago. In only the first two months of this year has the index of this group been below 200.

October shipments to the wholesale trade last month by manufacturers of service parts were at an index of 184, as compared with 185 in September, 176 in August, and 174 in October a year ago. The September figure was the highest on record for the service parts manufacturers.

Shipments of makers of service equipment, that is, garage machinery and tools, last month exceeded September, the index standing at 141 as compared with 140 in September and 120 in October a year ago.

Accessory sales to the wholesale trade in October were 91, as compared with 122 in September, 147 in August and 103 in October last year.

Schedules of original equipment makers indicate largely expanded car production for the early part of 1929.

Histed Heads Chicago Automobile Trade Association

Dealer Activities On Motor Row in Chicago Reported

By WALTER BERMINGHAM

CHICAGO, Nov. 24.—J. R. Histed, vice-president of the Hudson Motor Company of Illinois, has been elected president of the Chicago Automobile Trade Association, succeeding O. G. Heffinger, who has resigned.

Mr. Histed has been identified for many years with organization work in the automotive industry. He is second vice-president of the National Automobile Dealers' Association and a director of the Illinois Automotive Trade Association. He has long served in an official capacity with the Chicago trade association and is at present chairman of its labor committee, as well as the organization's representative in the Employers' Association of Chicago.

Mr. Histed has been the most active official of the Hudson Motor Company of Illinois since the inception of the firm. He came here from Minneapolis, where he was a successful dealer and a director of the Minneapolis Automobile Dealers' Association. Prior to that he was identified with the trade in Kansas City and is a former president of the Kansas City Motor Trade Association.

HEFFINGER RETIRES FROM CHICAGO MOTOR COMPANY

Mr. Heffinger, whose home is in Milwaukee, recently retired as an official of the Chicago Motor Car Company, Marmon distributors. He is at present enjoying a vacation.

WEBSTER NOW HEAD OF ORPHANS' DAY ASSOCIATION

William E. Webster of the Automobile Club of Illinois was elected president of the Orphans' Automobile Day Association of Chicago at its annual meeting this month. He succeeds John C. Emery. Capt. Charles H. Fingerhuth of the Medinah Motor Club was elected president, Nate Jacobs treasurer, and James C. Gilruth of the Chicago Automobile Trade Association secretary.

STUDEBAKER SALES CO. PLANS NEW BRANCH

The Studebaker Sales Company of Chicago, of which Henry R. Levy is president, has acquired the northeast corner of Michigan Avenue and 26th Street as a site for a new sales building. The structure, which will cover 193x161 feet, will be two stories high and with the land will represent an investment of $500,000. The new building will make the eleventh branch in Cook county maintained by the Studebaker distributor.

G. C. NORWOOD GOES INTO MANUFACTURING BUSINESS

George C. Norwood, formerly vice-president and general manager of Thomas J. Hay, Inc., Chandler distributor, has embarked in the manufacturing business. He is now connected with the Gaylo Manufacturing Company, 829 North Michigan Avenue., makers of metal specialties.

PACKARD SERVICE CHIEFS ATTEND ALL-DAY SERVICE

An all-day service meeting at the Metropole Hotel attracted seventy-eight service managers of Packard branches and dealer organizations in the Chicago district. The sessions were in charge of N. H. Peterson, general service manager of the Chicago factory branch of the Packard Motor Car Company. Representing the factory were Messrs. Stalker, Williams and Harrison from Detroit.

WITT-MAGNUSON MOTORS A NEW ORGANIZATION

A new organization in Chicago is Witt-Magnuson Motors, Inc., composed of F. E. Witt and W. V. Magnuson. The company purchased the Broadway branch of Community Motors, Inc., Oakland-Pontiac distributors, and its place of business is at 5139 Broadway. Mr. Witt has for the past three years been manager of the Michigan Avenue sales branch of Community Motors at 2323 South Michigan Avenue, and before that was, for some time, with the Pierce-Arrow Sales Corporation. Mr. Magnuson was manager of the Lawrence Avenue branch of Community Motors for a year and a half before going to the Broadway branch about two months ago.

NIKOLAS GARAGE NAMES PARKER SALES MANAGER

W. F. Parker has returned to Chicago after an absence of some years and has been appointed sales manager of the Nikolas Garage and Sales, Reo dealers, at 2136 South Western Avenue. His last automotive connection in Chicago was as assistant to A. J. Banta, then manager of the Chicago Maxwell branch.

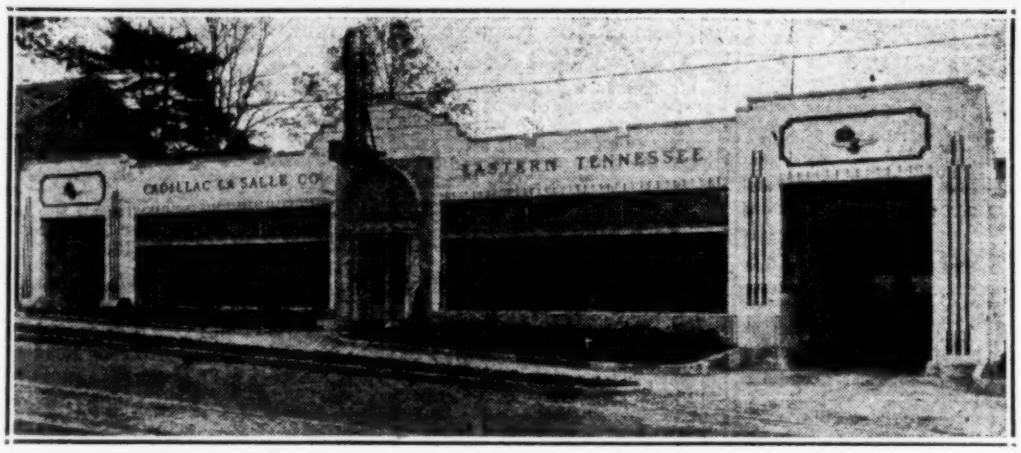
DELEGATES FROM CHICAGO ATTEND FINANCE MEETING

Several Chicago representatives of automobile financing concerns attended the annual meeting of the National Association of Finance Companies held in New York this week. Included among these was W. G. Tennant of Tennant Motors, Ltd., one of the most progressive finance organizations in the Middle West.

SYKES AT HOME-COMING FOR GRAHAM BROTHERS

B. G. Sykes of the Bird-Sykes Company, Graham-Paige distributors, attended the "home-coming" of the three Graham brothers at Evansville, Ind., this week. On November 17 the Chicago distributors observed their silver anniversary. During that period the firm has grown to a commanding position in the automotive field, maintaining one of the largest sales and service stations in the West.

CADILLAC-LA SALLE COMPANY. One of the newest and most attractive automobile sales establishments in Knoxville, Tenn., is shown below. It is located at 18th Street and West Cumberland Avenue. W. F. Stockell is president of the firm and also of the Nashville and Chattanooga branches. A. W. Davis, vice-president and general manager, has direct charge of the Knoxville branch.



NEW ORLEANS PEERLESS BRANCH REORGANIZED

New Orleans, La., Nov. 24.—Following the unfortunate death recently of Joseph Oster, veteran automobile dealer and head of the Peerless branch here, the branch has been reorganized with Mrs. Amelia Oster as president of the corporation, which will be under the active management of Fred and Hubert Oster.

Fred Oster is vice-president of the corporation, while Hubert is secretary and treasurer. Both are sons of the late Mr. Oster and of Mrs. Oster. Mrs. Oster, president of the concern, although not actively participating in the management, has shown a keen interest in the automobile business of her husband and sons and is keeping in close touch with the affairs of the Peerless concern. In continuing the Oster business, the two sons and Mrs. Oster are carrying forward a business that has been located at the same site and has been actively in business there for nearly three-quarters of a century.

New York, Nov. 24.—Members of the Merchant Truckmen's Bureau of New York attended a dinner meeting last Thursday evening at Cavanagh's Restaurant, at 258 West 23d St. A nominating committee was appointed to name officers who will be elected at the January meeting.

ULMER-JACOBS CO. TO HANDLE DE SOTO LINE

Bucyrus, O., Nov. 24 (U. T. P. S.).—The Ulmer-Jacobs Motor Company has been organized here for the sale and servicing of the De Soto line of motor cars. Officers of the new company are: E. F. Jacobs, president and manager, and H. D. Ulmer, secretary and treasurer. The company's sales rooms are located at 236 South Sandusky Ave.

HARTMETZ BROS. OBSERVE THIRTEENTH ANNIVERSARY

Evansville, Ind., Nov. 24.—Hartmetz Brothers, Dodge Brothers dealer, 1st Avenue and Ingle Street, celebrated their thirteenth birthday as automobile dealers recently. The showroom has been decorated and carries the number "13" prominently displayed. The birthday celebration was made the occasion for a sale of used cars.

CHRYSLER DEALERS IN EVANSVILLE AREA MEET

Evansville, Ind., Nov. 24.—The advantages of a systematic method of conducting business in sales volume and the advantage of great volume production in dealer deliveries were points stressed at the recent meeting here of Chrysler dealers from Evansville, Terre Haute, Ind., Owensboro, Ky., and Cairo, Ill.

Forty-two Chrysler distributor and dealer firms were represented at the meeting held at the Hotel McCurdy at noon. Following luncheon, talks were made by C. A. Davis, Detroit, manager of the dealer operation department; J. B. Covell, Detroit, central west regional manager; H. O. Doyle, St. Louis, district manager, and W. A. Warner, territorial manager, all of the Chrysler-Dodge Brothers Motor Corporation.

CAR SALES UP IN NEW YORK AREA

NEW YORK, Nov. 24.—Registration figures for all makes of cars sold in the New York metropolitan district during the period from January 1 to November 1 of this year show a total of 132,620 cars, as against 105,654 cars for the same period in 1927, according to figures compiled by the C. H. Jennings Corporation, Graham-Paige dealership in New York.

These totals represent an increase for sales this year of 25,966, or 26 per cent., according to the company's statisticians.

An outstanding item of interest in the percentage of increase is the fact that all but seven makes of cars showed an increase over last year, ranging from 7 per cent. up. Graham-Paige showed the largest gain, with 244 per cent.

The new car registrations to date for 1928 are also greater than any previous year, beating even the record-breaking 1926, when 111,656 new car deliveries were made during the first ten months.

Another very interesting angle pointed out by the Graham-Paige dealer is figures showing the ratio of registrations to population. For instance, exclusive of cars in the Ford and Chevrolet class, in Manhattan one new car was delivered to every 118 people living in this county. In Kings county one out of every 113 people purchased a new car in 1928. In Queens the figure is 71, in Bronx 117, in Richmond 79.

In the suburban districts there is a decided increase in the proportionate registrations, indicating that people who live in these communities can either better afford cars, or find more use for them.

As an example, in Westchester one new car (again excluding light cars) was delivered to every 35 people. In Suffolk county the ratio was but 25, while Orange county in New York showed the best record, with the astounding figure of a new car to every 10 of the population.

for Economical Transportation

CHEVROLET

By every standard of comparison, the Outstanding Chevrolet is an automotive sensation—providing a combination of performance, beauty, comfort, safety and handling ease that has never before been approached in a low-priced automobile.

The ROADSTER	$525	*The Sport* CABRIOLET	$695
The PHAETON	$525	*The Convertible* LANDAU	$725
The COACH	$595	LIGHT DELIVERY CHASSIS	$400
The COUPE	$595	1½ TON CHASSIS	$545
The SEDAN	$675	1½ TON CHASSIS WITH CAB	$650
		SEDAN DELIVERY	$595

All Prices f. o. b. Flint, Michigan

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

QUALITY AT LOW COST

Bigger and Better

Automotive Daily News

"Of, By and For the Entire Automotive Industry"

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Saturation?

AT THE RECENT MEETING in New York of the finance companies, Milan V. Ayres, economic analyst of the organization of these companies, intimated that the saturation point in new automobile sales had just about been reached. "There was a time," said Mr. Ayres, "when automobile finance companies could anticipate a large increase in business every year, just because there was a large annual increase in automobile sales from year to year. That day is gone forever."

Later in his speech Mr. Ayres remarked: "Sales of new cars in this country hereafter will be chiefly replacements and only a comparatively small part will come from an increase in the number of owners."

It is perfectly obvious that with a motor vehicle for nearly four-fifths of the families in America, the replacement business is bound to be the backbone of the market. The passenger automobile is essentially a family investment. With more than twenty million families out of a total of twenty-eight or twenty-nine, obviously the new owner market has tightened up tremendously since the days when the drive was on to motorize the American household.

We must not, however, lose sight of the fact that American families are increasing at the rate of about 1,500,000 per annum. To be conservative, let us say that the actual increase is 1,000,000 families, through marriage, minus divorces and the deaths which break up existing families. Allowing for the fact that new families are usually formed by young couples, who have not always achieved the financial status that makes them prompt purchasers of motor transportation, still a proportion of the new families will be in the market for cars. The proportion of buyers in the new family class, if it equaled that of the average American family, would be say 750,000. To be conservative let us halve that figure and place the number of potential motor car buyers at 375,000.

It is no longer possible to limit the motor car purchasing of the American family to a single vehicle. Within the past few years of prosperous conditions, the two-car idea has become widely disseminated. We are certainly justified in believing that this idea of a family's owning motor vehicles enough to supply transportation for the household rather than for the master of the house alone will grow. In fact, the records show that it is growing. It would certainly be conservative to say that 375,000 families in America each year graduate from the one car class to the two-car category.

These two classes of potential motor transportation buyers, the new families and the newly converted two-car families, should contribute to the market for new cars about 750,000 buyers. This would represent approximately the number of new buyers on which the finance companies and the automotive industry can rely as the addition to the replacement market in maintaining growth.

In the course of his speech, Mr. Ayres made a truly constructive suggestion to the finance companies. He suggested that this branch of the industry reach out into the service field for an opening to increase its business. Financing service stations ought to open a profitable field for investment. The service branch of the industry is now receiving the earnest attention of the manufacturers. Building and selling vehicles is a vain effort if the department of the business charged with keeping them running and supplying satisfactory transportation is not on the job. Undoubtedly the service end of the business has been hampered in the past by insufficient financing. The answer would seem to be obvious and we trust that the finance companies will give careful consideration to Mr. Ayres' suggestions.

S. A. E. GROUP DISCUSSES BRAKES AT PHILADELPHIA

Philadelphia, Nov. 24. — An unusual program of short talks and discussions on brakes, their construction, performance and troubles, brought out a record attendance of 237 members and guests of the Society of Automotive Engineers, held in the rooms of the Philadelphia Automobile Trade Association, Broad and Olive Streets, on the night of November 13.

The discussions were under the leadership of John Warner of the Studebaker Corporation, South Bend, Ind., and the speakers were P. M. Heldt; H. H. Allen of the Bureau of Standards; E. B. Neil, H. B. Hewitt, Philadelphia Rapid Transit Company and others. A. Gelppke, engineer, of the Autocar Company, Ardmore, Pa., president of the Pennsylvania section of the S. A. E., presided.

MOTOR INSURANCE ON INSTALLMENT PLAN NOW

Boston, Nov. 24.—Installment payments for compulsory automobile personal liability insurance premiums are being offered by the William A. Muller Investment Corporation of this city, the first firm of underwriters to make this offer.

This form of payment is offered only to those who have had no accidents in 1928. First payment is $3 on receipt of order, the office certifying to the insurance to the registrar of motor vehicles and enabling the car owner to secure his license plates. The balance of the premium due is payable in nine equal monthly installments.

W. S. McLAIN NOW WITH LENNEN & MITCHELL, INC.

Special from A. D. N. Detroit Bureau

Detroit, Nov. 24.—W. S. McLain, well known in automotive and newspaper circles here, has joined the staff of Lennen & Mitchell, Inc., New York city, handling the account of the Hupp Motor Car Corporation. Mr. McLain, who was formerly connected with the Chrysler interests, will make his headquarters in Detroit.

MOOCK IS VICE-PRESIDENT OF H. M. BALLARD, INC.

Chicago, Ill., Nov. 24.—Announcement is made by H. M. Bullard, Inc., distribution egineers, of the entry into their organization of Harry G. Moock, former managing director of N. E. A. marketing activities, as vice-president in charge of merchandising. The Ballard organization is one of the years' activity and specializes in the development of markets and the distribution of merchandise for private business ventures in over 100 different fields of production and sales activity.

CALENDAR OF COMING EVENTS

NOVEMBER

29-Dec. 9—**Buenos Aires, Argentina.** Auto show.

DECEMBER

1- 9—**Chicago, Ill.** Aeronautical Exposition at Coliseum.
1-10—**Montevideo, Uruguay.** 6th annual motor show.
2- 8—**New York city.** Automobile Salon at Hotel Commodore.
3- 7—**New York city.** American Society of Mechanical Engineers' annual meeting.
4- 6—**Chicago, Ill.** American Petroleum Institute ninth annual meeting at Stevens Hotel.
—**Seattle, Wash.** Automotive Maintenance Association, annual banquet.
6- 7—**Chicago.** Society of Automotive Engineers' Aeronautic Meeting.
8- 9—**Fort Worth, Tex.** National Gasoline Association, annual convention.
8-19—**Brussels, Belgium.** Automobile and motorcycle show.
10-12—**New York City.** National Highway Traffic Association annual meeting.
10-15—**New Orleans, La.** Seventh Annual Asphalt Paving Congress.
12-14—**Washington, D. C.** International Air Conference.
13-14—**Washington, D. C.** National Research Council

JANUARY

7-12—**Camden, N. J.** Automobile Show
8-12—**Philadelphia.** American Welding Society, meeting, Bellevue-Stratford Hotel.
10—**New York city.** Society of Engineers, annual dinner at Hotel Waldorf-Astoria.
5-12—**New York city.** N. A. C. C. Show
11-20—**Amsterdam, Holland.** Automobile show.
12-19—**Buffalo, N. Y.** Automobile show.
12-19—**Newark, N. J.** Automobile show.
12-19—**Philadelphia, Pa.** Automobile show.
12-19—**Milwaukee, Wis.** Automobile show.
13-19—**Cincinnati, O.** Automobile show.
14-18—**Los Angeles, Cal.** American Society for Steel Treating, semi-annual meeting.
14-18—**Los Angeles, Cal.** Western States Metal and Machinery Exposition.
14-19—**Atlanta, Ga.** Automobile show.
14-19—**Cleveland, O.** American Roadbuilders' Association, Inc., Convention and Show.
15—**Cleveland, O.** Equipment for Motor Trucks, Inc., members and visitors meeting.
15-18—**Detroit, Mich.** Society of Automotive Engineers, annual meeting.
18-26—**Columbus, O.** Automobile show.
19-21—**Montreal, Canada.** National Motor Show of Eastern Canada.
19-26—**Albany, N. Y.** Automobile Dealers Association, automobile show.
19-26—**Pittsburgh, Pa.** Automobile Dealers Association, passenger car, accessory and shop equipment show.
19-26—**Detroit, Mich.** Detroit Automobile Dealers' Association Show at Convention Hall.
19-26—**Baltimore, Md.** Automobile Show, 5th Regiment Armory.
19-26—**Louisville, Ky.** Automobile show at Armory.
21-26—**Wilmington, Del.** Automobile show.
21-26—**Scranton, Pa.** Automobile show.
21-26—**Rochester, N. Y.,** Automobile show
23—**Detroit, Mich.** Auto Trade Association, Ninth Annual Convention at Book Cadillac Hotel.
23-Feb. 6—**Cairo, Egypt.** 2d international automobile show.
24-25—**Greensboro, N. C.** North Carolina Automotive Trade Association, annual convention.
26-Feb. 2—**Chicago.** Automobile Salon at Drake Hotel.
26-Feb. 2—**Chicago.** N. A. C. C. Show.
26-Feb. 2—**Cleveland, O.** Automobile show
26-Feb. 2—**Washington, D. C.** Automobile Show.
26-Feb. 4—**San Francisco, Cal.** Automobile show.
28-29—**Chicago, Ill.** National Automobile Dealers Association convention at Palmer House.
28-Feb. 2—**Elmira, N. Y.** Automobile Merchants' Association, annual show
30-Feb. 16—**Rome, Italy.** International Salon.

FEBRUARY

2- 9—**Harrisburg, Pa.** Nineteenth Annual Automobile Show.
2-10—**Seattle, Wash.** Automobile show.
4- 9—**Ottawa, Canada.** Motor Show at Coliseum.
4- 9—**Syracuse, N. Y.** Automobile Show.
4- 9—**St. Louis, Mo.** Automobile Show.
4- 9—**Grand Rapids, Mich.** Automobile Show.
5- 9—**Peoria, Ill.** Automobile Show.
9-16—**Kansas City, Mo.** Automobile Show at American Royal Building.
9-16—**Los Angeles, Cal.** Automobile Salon at Hotel Biltmore.
11-16—**Denver, Colo.** Automobile Show at Auditorium.
13-16—**Mankato, Minn.** Automobile Show.
13-18—**Denver, Col.** Automobile show.
16-23—**Hartford, Conn.** Automobile Show.
18-23—**Des Moines, Ia.** Automobile Show.

Feragen Tells Boston S.A.E. Of Front Wheel Alignment

By F. N. HOLLINGSWORTH

Boston, Mass., Nov. 24.—A meeting of the New England section Society of Automotive Engineers was held Wednesday at the Engineers' Club. K. T. Brown, general service manager of the Packard Motor Company, presided and A. L. Feragen of Seattle, Wash., and the Motor Wheel Corporation, Lansing, Mich., was the speaker.

Mr. Feragen spoke at length on the problem that has caused service men many gray hairs, "The Relation of Wheel Alignment to Premature Tire Wear." He also dwelt somewhat upon the inherent error in the present type of front axles and declared that we would always have the problems of shimmy, tire abrasion and tendency of front wheels to turn to left or right on striking bumps or rough spots in the road with the present type of front axle. Following the address the meeting was open to questions and answers from members.

"Front wheel camber, axle caster, toe-in and steering geometry are perhaps four of the most neglected mechanical adjustments in the present-day motor vehicle," said A. E. Feragen of A. E. Feragen, Inc., Seattle, Wash., in a paper presented at the meeting last night.

"With the old high pressure tires with small cross section," he continued, "little trouble was experienced in steering and abnormal tire wear and shimmy were practically unknown."

For that reason, he claimed, many of the people today are inclined to lay all the tire troubles directly on the tires when in this day of low pressure tires and increased road speeds a perfect adjustment of the front end is necessary if long wear and proper steering and freedom of shimmy are desired. Mr. Feragen urged that the public be educated to have special inspections made of the front end assembly at given frequent periods just as they have certain other parts of their car inspected at the present time.

As high as 90 per cent. of such unusual tire wear as cupping, spotty wear, side wear and unusually rapid wear, he said, can be attributed to improper alignment of the front wheels, wrong axle setting, faulty steering geometry and under-inflation. The remaining 10 per cent., he said, could be attributed to poorly adjusted brakes, out of round brake drums, wheels and tires out of balance, crooked wheels, rims mounted improperly and worn or loose steering mechanism.

A. E. Feragen, Inc., has developed a series of wheel testing and aligning tools which are used to correct and check the front assembly.

"The three-way aligning gauge," said Mr. Feragen, "may be likened to a section of the road, mounted on ball bearings, free to move sideways in either direction, and as a vehicle rolls over it, yields to any thrust, thus giving a visual reading of the slightest abrasive action of the tires. It is possible with this gauge to check and correct steering geometry (misalignment on right and left turns) and to clearly show the devastating effect of steering error when combined with excessive camber.

"Camber is the amount in inches or degrees that the front wheels are set outward at the top so that the greater part of the weight and thrust of the front end of the vehicle is taken by the largerf inner wheel bearings. Camber has a great influence on tire wear if present in excessive amount and particularly so if run in combination with poor steering geometry (misalignment on right and left turns). The tire in such case will wear on the outside of shoulders, and cupping or spotty wear will develop near the center, while directly on the center it shows very little wear.

"Toe-in is the direct result of camber and means that the wheels are closer together in front of the axle than in rear. Cambering wheels causes them to run out and the toe-in is given to offset this tendency. Toe-in is directly related to pitch and caster, and the slightest change in either necessitates a different toe-in. It has been found that the pitch and caster are rarely alike in any two cars of the same make and model. This is especially true after the car has been in service for some time. Springs settle, snubbers may be installed, road shocks and natural wear play a part as well as the grabbing of the front wheel brakes which twist the axle. All these things contribute to change the pitch and caster of the front wheels.

"Toe-in should always be set so that the front wheels run with a true rolling contact. Too much or too little toe-in causes excessive tire wear. Caster is the amount in degrees that the top of the front axle is tilted toward the rear of the vehicle. This is done so that the front wheels will tend to run in a straight-forward position while driving. Too much caster makes the vehicle steer hard and results in shimmy. Too little caster causes the front wheels to wander and dive, necessitating constant steering. Caster is controlled by tapered shims between the axle and the springs.

"Caster must be the same at each end of the axle, as any variation changes the relative toe-in of the two wheels, causing one to scuff or drag more against the road than the other.

"Steering geometry is the mechanics of keeping the front wheels in proper relative alignment as they are turned full over the right lock or the left lock. Steering knuckle arms are sometimes thrown out of line through curb bumps, road shocks, or parking too closely against a high curb and then forcing the front wheels out with power applied. The Three-way aligner will correctly gauge this error in steering and with it it is possible to return the steering knuckle arms to their proper position.

"Most of these defects in steering can be corrected providing the proper instruments are used to determine the exact trouble and to check corrections after they have been made.

"In cases of too much caster the caster should be reduced and the wheels then aligned. An accurate caster gauge should be used to check both ends of the axle. Wheels out of balance may be corrected by boring a hole in the steel felloe and bolting a sufficient number of washers to correct. Tires out of balance are best corrected by new tires, but are often the result of boots in the shoe or other repairs, and may be balanced accordingly.

"A complete wheel aligning service is most desirable from the tire merchant's point of view, as it will result in new customers, is profitable in itself, and settles for all time any controversies from premature tire wear by merely checking the vehicle in the owner's presence.

"It is such a complete service and inspection equipment li
ing offered by my con

Duluth Tire Men Tell How to Meet Mail Order Competition

One-Stop Station For All Service Is Recommended

By ARTHUR G. PATTERSON

DULUTH, MINN., Nov. 24.—That mail order competition can be overcome by the retail tire dealer through operation of super-service stations offering one-stop service was the salient factor brought out in a recent survey of retail tire dealers and their opinion regarding effect of mail order competition on the independent retail tire dealer.

Better merchandising methods were also recommended as one of the most important methods of overcoming mail order competition. It was brought out that there are at present two types of tire dealers in the retail tire industry, of which time will cause the elimination of one of these types for the betterment of the entire automotive industry as a whole. The first type was found to be merchandisers of the best type, who were successfully combating mail order competition, though the results are as yet slow.

The second type was lacking in business methods and was a price-cutter, not giving service and found more time to complain of mail order competition than utilizing such time for efforts to conbat it. Complete elimination of the latter type of dealer was forecast in the future because of lack of ability to compete with mail order competition. Many interesting methods of overcoming mail order competition, as practiced by the leading dealers of Duluth, was also brought to light.

Sid W. Jensen, president of Sid W. Jensen, Inc., Firestone dealer handling Willard batteries, said:—

"To meet mail order competition we have four lines of tires that we sell to the public on a basis of better quality at mail order prices. We give service with each tire sold, and feel that with quality, price and service, we are able to convince the public that we are much better able to care for their tire needs than the mail order or chain store. Mail order and chain store competition affects us very little. We also advocate one-stop service as a means of the retail tire dealer increasing his profits.

"Besides selling tires we repair tires and inner tubes, sell batteries, recharge, repair and rebuild batteries, sell rims, gasoline, oils, grease automobiles, wash automobiles, reline brakes, give free advice on wheel alignment and maintain a department for that class of work, give free road service in the city limits, inspect and mount tires free of charge. We obtain business by use of newspaper advertising, handbills, direct mail and personal solicitation."

M. F. Frye, manager of the Arrowhead Tire Company, Inc., Fisk distributor in northern Minnesota, said:—

"We carry a competitive line of tires. We cater to a better class of people than the mail order house does, and I do not think price is the main factor, as quality and service really count in the end."

A. Amundsen of the Amundsen Tire Company, general dealer, said: "We don't try to compete with the mail order and chain stores. We cater to a select class of people who would never think of going to a mail order house for their tires. I think that there are 25 per cent. of the people in Duluth who are willing to pay a good price for a good tire, and that is the class of people we deal with."

"We use direct mail advertising mostly to get our business. And when we sell a tire to a man we are not through there, we have only started, and we give service for the life of the tire. I think that the mail order competition is confined to the farmer and laborer who can't afford to operate his automobile over 5,000 miles a year. To the dealer who does compete with mail order competition I would suggest better merchandising and perhaps diversified service."

Louis S. Kazmier, operating the Duluth Auto Tire Repair Company, Mason dealer, said: "I think the fault lies with the manufacturer who sells tires to the mail order houses. There are too many misfits in the tire business who would make better in some other line of business. That the tire dealer who makes a success out of the tire business in the future has got to give service is my opinion."

A. G. Anderson, manager of the Ryan Tire Company, Goodrich retailer, said:—

"I think that the manufacturers should control their retail outlets. Today you can buy a tire in anything from a filling station to a furniture store. Mail order competition will always be with us, but I think it will be confined to the farmers and people in small towns. Elimination of the 'deadwood' in his retail organization and substitution of better merchants will aid both the manufacturer and retailer in combating mail order competition. I also see the day when dealers who are dealers and know their goods will have to erect master service stations and give one-stop service to the motoring public. Besides selling quality, we give service that we know will win the class of people we want to serve. We use direct mail advertising in our business."

Has Own Concern

GLENN B. HICKS

Duluth, Minn., Nov. 24. — Announcement of the purchase of the Duluth branch of the Northwestern Tire Company, with headquarters in Minneapolis, was made by Glenn B. Hicks, former manager of the Duluth branch and new proprietor. Mr. Hicks has been employed by the Northwestern Tire Company of Minneapolis for six years and was manager for that firm in Duluth for two years. The new firm will be known as the Glenn Hicks Tire Service and is located at 709 East Superior St. Lee tires, Watson stabilators, and a complete vulcanizing and tire repair service using the Hawkinson system will be maintined by this new tire firm.

Besides operating the former branch in Duluth, which it has sold to Mr. Hicks, the Northwestern Tire Company operates branches in Minneapolis, St. Paul; Albert Lea, Rochester, and Mankato, all in Minneapolis, St. Paul, Albert Lea, Crosse, and Chippewa Falls in Wisconsin.

EXPORTS OF FRENCH TIRES UNDER 1927 FIGURES

Washington, Nov. 24.—Exports of French tires and tubes during the first nine months of this year showed a decline as compared to the same period of last year, according to figures compiled by the rubber division of the Department of Commerce. Total exports this year amounted to 17,069,500 kilos as compared to 22,266,500 kilos in the first nine months of 1927.

WILL BUILD ADDITION

Kansas City, Nov. 24.—The Sledlitz Paint and Varnish Company, manufacturer of a popular automobile body lacquer, has contracted for the erection of an addition to its factory here.

Increased Output Being Planned for Cleveland Plants

(Continued from Page 1)

parts, is erecting a seven-story warehouse and adding five new stories to its present two-story warehouse.

Among the numerous other projects are:—

Cloyes Gear Works: Erecting new $20,000 factory.

The United States Air Compressor Company ocmpletes new plant with 22,000 feet of floor space to increase production.

Osborn Manufacturing Company announces development of new portable-type molding machine for producing medium-sized automobile parts.

Bell Metal Stamping Company has established a plant at 1784 East 37th St. for the manufacture of light metal stampings for automotive manufacturers.

Guide Motor Lamp Company working at full capacity day and night to meet demands of General Motors units. New $100,000 factory expansion also rushed.

Lincoln Electric Company places on market new electric arc welder.

Cleveland Metal Hose Company, incorporated, with Edward S. Pierce as president, to manufacture automotive metal hose.

Gears and Forgings, Inc., announces plans to construct factory addition of three stories, seventy-two feet square.

Sinclair-Cox Company recently incorporated, announces plans for manufacture of motor hoods.

Charles Krejsa erects commercial garage building costing $40,000.

Birkett L. Williams, Ford dealers lease new sales quarters with 21,000 square feet of floor space at 4501 Euclid Ave., disposing of building at 10642 St. Clair Ave.

Peerless Motor Car Company awards contract for $25,000 factory addition.

Cleveland Tractor Company begins capacity production of new model tractor.

Electromotive Company expands to meet increased demand for gas-electric railroad units, motors being built by Winton Engine Company.

Glo-ite Company incorporated here to manufacture automobile polishing compounds at 1792 Ansel Road.

North Piston Ring Company incorporated to manufacture automotive piston rings at 205 St. Clair Ave.

Briggs Manufacturing Company completing remodeling of factory in Taft Avenue, near East 131st Street, and is soon to start production of automobile bodies with force of 900.

Otis Steel Company completes installation of third new open-hearth furnace in program necessitated by increase in automobile buying.

Buckeye Forging Company announces plans to build $35,000 addition to plant for use as machine shop.

Cleveland Cutter and Reamer Company erecting two factory additions for increased production and for special heat-treatment plant.

Hanna Garage Company erecting three-story addition to its East 12th Street garage, and plans addition of two additional stories later to make building ten stories high.

DEMAND INCREASES FOR BODY-TYPE HARWOODS

Chicago, Nov. 24.—It is reported in the Chicago lumber market that heavier inquiry is going to the Wisconsin and Michigan sawmills for the hardwoods in the species, grades and thicknesses used by the automobile body plants. Northern operators are confident that the body plants across the lake soon will be taking thick hard maple and birch in heavy volume. Demand at present is largely for 6x4 and 8x4 hard maple in the No. 2 common and better grades.

HUDSON AUTO BODY COMPANY MOVES IN LARGER HOME

Jersey City, N. J., Nov. 24.—The Hudson Auto Body Company has moved to larger quarters at 3468-70 Boulevard, the former premises of Jay Begtrup. New equipment, modern machinery, improved painting plant and service station have been installed.

Hupp Acquires Control Of Chandler-Cleveland

(Continued from page 1)

ing them a total market valuation of $80,103,446.

F. C. Chandler, Sr., president; Sid Black, vice-presiednt, and Fred C. Chandler, Jr., of Chandler-Cleveland, were all out of town, it was reported from Cleveland, and other officials would not comment on the report.

Hupp's acquisition of control of Chandler-Cleveland marks the first entry of a Detroit motor car manufacturer into the ranks of Cleveland's largest automobile producers.

Hupp has had a record-breaking year in 1927-8, after announcement of new models. Chandler-Cleveland, a consolidation of the Chandler and Cleveland companies, also owns the Atlas Manufacturing Company and Automatic Machine Company, its parts producers.

The Chandler-Cleveland Company operates two plants in Cleveland turning out a complete line of eight and six-cylinder cars, while the Hupp factories are located at Detroit and Jackson, Mich., and Windsor, Ont.

According to reports in Wall Street, more than 60 per cent. of the Chandler-Cleveland stock has been purchased in the open market and earmarked for the Hupp interests. Negotiations with large minority interests for their holdings are said to be pending. Both Chandler-Cleveland issues carry voting privileges.

Hupp factory shipments in the first ten months of this year were 61,121 cars, as compared with 32,322 in the same period last year and 41,160 for the entire year 1927. Chandler-Cleveland production or shipments have not been announced by the factory.

Registerations of new cars, as compiled by Automotive Daily News, show that in the first nine months of this year 47,043 Hupmobiles were sold in the United States, as compared with 26,032 in the first nine months last year, and 33,586 in the entire twelve months of last year. Chandler-Cleveland sales in the first three-quarters of this year were 11,997, as compared with 15,645 in the first nine months last year and 18,187 for the entire 1927.

New Accessory Dealers

MARYLAND

Hagerstown, Nov. 24.—Augustus Ludwig, a pioneer in tire selling in this city, has formed the Ludwig Tire and Parking Company. The outdoor parking space will accommodate 350 cars and is the largest and the only one of its kind in this state. The parking space is well protected from storms, and while it is not heated it resembles a large garage. His cheaper parking rates, up-to-date service station and tire sales have already provided a flourishing business.

WASHINGTON

Spokane, Nov. 24.—Superior Tire Service, Inc., has been organized with M. N Purdy as its manager, to take over the Fisk Tire Company's branch house here.

G. M. Export Sends Out Invitations for New Film Premiere

New York, Nov. 24.—"The World Builds a Motor Car," is the title of a new film production to be presented for the first time to an invited audience at the Mecca Temple, 133 West 55th St., December 11. The film was produced by the General Motors export division. It glorifies the modern automobile as a world civilizer and economic benefit.

Invitations for the premiere are being issued by J. D. Mooney, president of the General Motors Export Company. The audience will include leaders of the automotive industry. The film was previewed recently by members of the board of directors of the General Motors Corporation.

The film compares transportation methods of all ages. It portrays the early methods of transporting goods by caravan over the old trade routes. There is a thrilling picture of a full-rigged clipper ship enacting its romantic part in the development of international trade and one of the first steam railroad trains is faithfully reproduced. From the plodding camel hoofs on the desert sands to the limitless speed of the airplane the picture portrays the progress and development of civilization.

Into the ever-changing drama of civilization comes the motor car as the greatest of all civilizers and boon to progress. The film unfolds the story of the automobile. It illustrates how the development of automotive transportation has brought with it a new era in international trade.

CHASE BRASS TO START FIRST CLEVELAND UNIT

Cleveland, Nov. 24.—The first $2,000,000 unit of a $5,000,000 plant here of the Chase Brass and Copper Company of Waterbury, Conn., is to be in operation by early summer, F. S. Chase, president, announced here today. The plant is to be the company's mid-West supply base.

Its product, semi-finished brass, will go into many automotive plants here where $25,000,000 of this product is used annually. The plant when completed will employ 2,500. It is to be located in a new Van Sweringen industrial district in Euclid Village, a suburb, with frontages on both Nickel Plate and New York Central railroads.

TWIN SERVICE GARAGE OPENED BY H. T. KIEFER

West New York, N. J., Nov. 24.—The Twin Service Garage, 609 Park Ave., has been opened by H. T. Kiefer, president, and formerly head of the University Garage. A modern car laundry is featured in addition to alemiting and the sale of accessories.

100,000TH NASH OF NEW "400" SERIES BUILT AT KENOSHA

Kenosha, Wis., Nov. 24.—With the factory whistles tooting, workers of the Nash Motors Company Advanced Six plant in Kenosha paused in their work yesterday to mark the completion of the 100,000th Nash car of the 400 series.

The car went off the assembly line in the presence of C. W. Nash, president of the company, and other officials, while hundreds of employees in the department cheered.

The car will be shipped to the Warren-Nash Company, New York, and will lead a parade down 5th Avenue in New York on the day it arrives.

INCOMES OF WORKERS HIGHEST SINCE 1920

New York, Nov. 24.—Industrial wage earners' incomes this fall reached their highest level since 1920, a year of inflation, and employment in manufacturing was at the highest point since April, 1927, according to the monthly reports made to the National Industrial Conference Board here by approximately 1,500 manufacturing establishments employing on the average some 800,000 workers.

The outstanding phenomenon in the labor situation, however, according to the board's analysis, is the marked stability of wage rates and earnings, which since 1923 have fluctuated less than 5 per cent. and during the current year have shown a slightly inclining trend.

Toledo, O., Nov. 24.—Ohio motorists paid an $18,564,138 tax on 641,668,373 gallons of gasoline sold during the first nine months of 1928, an increase of 54,000,000 gallons over the corresponding period last year.

New Dealer Appointments By States and Makes

ILLINOIS

Willys-Overland — Grote Motor Sales, Sullivan; Earl Eckhardt, Macon; Zimmerman Brothers, Versailles; H. & J. Motors, Inc., Chicago; M. E. Howland, Tampico; L. H. De Weerth, Bartonville; Howe's Garage, Annapolis.

Durant—Dixie Highway Motor Sales, Chicago.

Graham-Paige — Walker Rogers Company, Chicago; Elmhurst Sales and Garage, Elmhurst; Rex McConnell, Lexington; Thurmond & Hay Company, Marion; Powell Motor Company, Vienna; V. O. Vandergriff Motor Sales, Zeigler.

Moon—Paul A. Schnieder, Kankakee.

IDAHO

Willys-Overland — Oneida Motor Company, Malad; Naccarato Garage, Priests River.

Graham-Paige—Fraser Auto Supply Company, Nampa.

IOWA

Willys-Overland—Grandfield Motor Company, Lorimor; Jessup & Beymer Motor Company, Diagonal; Steil Motor Company, Emmetsburg; P. V. Fivecoat, Murray; Heiland Motor Company, Panora; E. R. Stahly & Co., Pocahontas; Jefferson Garage, Manly.

Moon—Barrows Motor Company, Burlington.

KANSAS

Willys-Overland — C. C. Hine, Gardner; A. D. Schmidt Motor Company, Russell; James Bennett, Lucerne; Dudley Motor Company, Downs; Koons Motor Company, Lindsborg; J. J. Frey, Belleville; Johnson's Garage, Vliets; J. E. Westman & Sons, Herndon; Harry Ford, Syracuse; William Wilson, Copeland; Gile & Francis, Caldwell; The Bonner Motor Company, Bonner Springs; H. B. Hertzler Motors, Lawrence; Gladden Motor Company, Kanorado; Denmark Mercantile Company, Lincoln; W. K. Motor Company, Beloit; S. O. Shepard, Chapman; Joe Shalz, Brewster; Dehler & Son, Sylvan Grove; M. & A. Motor Company, Smith Center.

KENTUCKY

Willys-Overland—Humphrey Motor Company, Louisville; King's Garage, Muldraugh; Garrison Service Station, Columbia; Bacon Motor Car Company, Frankford; F. P. Harter Motor Company, Louisville; Haselden Brothers, Lancaster; H. P. Smith, Sparta.

Graham-Paige—Sandy Valley Motor Company, Paintsville.

LOUISIANA

Willys-Overland — Lee Whippet Company, St. Joseph; Knight Motors Company, Inc., New Orleans; De Freese Motor Company, Ruston; Yearwood Whippet Company, Coushatta.

MAINE

Willys-Overland — Consolidated Motors, Portland.

Graham-Paige—Sanford Garage, Inc., Sanford.

MARYLAND

Willys-Overland—C. A. Caylor, Williamsport.

Graham-Paige — Service Station Garage, Denton.

MASSACHUSETTS

Willys-Overland—Overland Knight Motors, Inc., Salem.

Graham-Paige—Kraft Motor Sales Company, Chelsea; A. R. Myers, Inc., Revere.

MICHIGAN

Willys-Overland—Albert Cleland, Deckerville; Johnson & Yeager, Saginaw.

Durant—Waddell & Bowerman, Eaton Rapids; Waddell & Bowerman, Charlotte; Evans & Alverson, Wayne.

MINNESOTA

Willys-Overland—Millang Motor Company, Frank J. Greener, Reno; Renville Motor Company, Renville; E. P. Menzel, Waconia.

Durant—Hanson Motor Company, Waseca.

Graham-Paige—Benson Brothers Auto Company, Adrian; Ernest Debner, Glencoe; H. D. Boelter, Hutchinson; Rogness Garage, Kenneth; Mortrud Motor Sales, Minneapolis; Haase & Riecke, Wabasha; J. E. McComb, Walnut Grove; Wanda Garage, Wanda.

Moon—Neuwoehner Motors Company, Minneapolis.

MISSISSIPPI

Willys-Overland—Patrick Motor Company, Braxton; J. C. Hester, Tunica; Miller Motor Company, Weir; Greene Willys-Overland Company, Columbia; Wayne Whippet Company, Waynesboro.

MISSOURI

Willys-Overland — Moles Motor Company, Hamilton; Ellenberger's Garage, Polo; Mission Park Motor Company, Dodson; R. Simmons Motor Company, Buckner; Heckel's Garage, St. Joseph; Kerr-Cochran Auto Company, Seymour; Abbott Motor Company, Lebannon; Uptown Motor Company, Kansas City; Clinkenbeard Motor Company, Butler; Clyde O. Johnson Garage, Stahl; Everhart Brothers, Russellville; Suess Whippet Company, Chamois.

Durant—Motor Service Company, Charleston; Midway Motor Company, Steelville.

NEVADA

Willys-Overland—Nevada Vulcanizing Works, Elko.

NEW JERSEY

Willys-Overland—W. J. Walker, Teaneck; Auto Sales and Service, Tenafly.

Durant—Jefferson Auto Company, Newark; A. Pumo & Son, Guttenberg; Ashworth Durant Sales, Bloomfield.

NEW YORK

Gardner—Gardner Utica Motor Sales, Utica (distributor).

Willys-Overland—F. G. Gifford & Sons, Canastota; Syosset Sales and Service Company, Syosset, L. I.; Milligan Mossman Company, Little Valley; Austin's Garage, De Freesville; Cairo Garage, Cairo; C. H. Scutt, Hillsdale; John D. Mickie, Hudson; Nanuet Garage, Nanuet.

Graham-Paige—James G. Quinn, Rochester.

CURRENT PRICES OF PASSENGER CAR MODELS

AUBURN—76. 120 W. B.

Roadster	1,195	Sedan	1,395
Sport Sedan	1,295	Cabriolet	1,395
Victoria	1,395		

AUBURN—88. 125 W. B.

Roadster	1,495	Cabriolet	1,695
Sport Sedan	1,595	Sedan	1,695
Speedster	1,695	Phaeton Sedan	1,895
Victoria	1,695	Sedan	1,845

AUBURN—115. 130 W. B.

Roadster	1,995	Cabriolet	2,195
Sport Sedan	2,095	Speedster	2,195
Sedan	2,195	Phaeton Sedan	2,395

BUICK—6-cyl. Series 20. 116 W. B.

2 Bus. Coupe	1,195	4 C. C. Coupe	1,250
5 2-dr. Sedan	1,320	5 4-dr. Sedan	1,320
5 Touring	1,226		

BUICK—6-cyl. Series 40. 121 W. B.

4-Spt. Roadstr.	1,325	5 4-dr. Sedan	1,450
2 Bus. Coupe	1,395	5 De L. Sedan	1,520
4 C. C. Coupe	1,450	7 Touring	1,550

BUICK—6-cyl. Series 50. 129 W. B.

5 Spt. Touring	1,526	5 4-dr. Sedan	1,935
5 Coupe	1,865	7 Sedan	2,045
5 Brougham	1,875	7 Limousine	2,145
4 Con. Coupe	1,875		

CADILLAC—Fisher Custom. 140 W. B.

2 Coupe	3,295	5 Coupe	3,595
2 Roadster	3,350	5 Sedan	3,695
7 Touring	3,450	7 Sedan	3,795
4 Phaeton	3,450	4 Spt. Phaeton	3,950
5 Town Sedan	3,495	7 Imperial	3,995
Conv. Coupe	3,595		

CADILLAC—Fleetwood, 140 W. B.

5 Sedan	4,195	Tr. Town Cab.	5,250
5 Sedan Cab.	4,195	Tr. Town Cab.	5,500
7 Sedan	4,295	Tr. Town Cab.	5,500
5 Imperial	4,345	Tr. Lim. Brou.	5,500
5 Imp. Cabrio.	4,345	5 All Wr. Phae.	5,750
5 Club Cab.	4,395	5 All Weather Phae (Imp.)	5,995
7 Imperial	4,545		

CHANDLER—65. 110 W. B.

Coupe	875	Sedan de luxe	995
Sedan	895	Sportster	995
5 Touring	895	Cabriolet	1,075
R. S. Coupe	965		

CHANDLER—Big Six. 124 W. B.

Metro. Sedan	1,525	Cabriolet	1,525
4 Coupe	1,725	7 Sedan	1,925
3 C. C. Coupe	1,725	Berline Sedan	2,025
7 Touring	1,725		

CHANDLER—75. 118 W. B.

Brougham	1,295	Sedan	1,395
Coupe	1,295	De Luxe Sedan	1,495

CHANDLER—Royal 85. 124 W. B.

Sedan	1,795	5 De L. Sedan	1,995
4 Coupe	1,925	Cabriolet	2,095
3 Coupe	1,925	7 Sedan	2,195
Touring	1,995	Berline Sedan	2,295

CHEVROLET—6-cyl. 107 W. B.

Phaeton	525	Sedan	675
Roadster	525	Sport Cabriolet	695
Coach	595	Convert. Landau	725
Coupe	595		

CHRYSLER—6-cyl. 65.

Bus. Coupe	1,040	Touring	1,075
Roadster (R.S.)	1,065	4-dr. Sedan	1,145
2-dr. Sedan	1,065	Coupe (R.S.)	1,145

CHRYSLER—6-cyl. 75.

Royal Sedan	1,535	Roadster (R.S.)	1,555
Coupe (R.S.)	1,535	Town Sedan	1,655

CHRYSLER—"Imperial 80." 112 B. H. P.

Roadster (R.S.)	2,795	7 Sedan	3,075
Sedan	2,945	Sedan Lim	3,495
Town Sedan	2,995		

CUNNINGHAM—8-cyl. 132 W. B.

4 Touring	6,500	4 Coupe	8,000
2 Roadster	6,500		

CUNNINGHAM—8-cyl. 142 W. B.

7 Touring	7,000	6 Limousine	8,500

DAVIS—8-cyl. 120 W. B.

Princess Coupe	1,885	Polo Roadster	1,885
5 Touring	1,885	Emperor Sedan	1,885

DE SOTO—6-cyl.

Faeton	845	Cupe De Lujo	885
Roads'r Espanol	845	Sedan	885
Business Coupe	845	Sedan De Lujo	955
Sedan Coche	845		

DODGE—Victory Six. 6-cyl. 112 W. B.

2 Coupe	845	Touring	995
Sedan	895	Sport Roadster	995
4 Coupe	945	Sport Sedan	1,045
De L. Sedan	945	Sport Touring	1,245

DODGE—Senior Six. 6-cyl. 120 W. B.

2-dr. Vic. Bro.	1,575	Sport Coupe	1,795
4-dr. Sedan	1,675	Sport Sedan	1,795
2 Coupe	1,675	4-dr. Lan Sed.	1,845
2-dr. V. Br. Sp.	1,695		

DODGE—Standard Six. 6-cyl. 110 W. B.

Coupe	725	Cabriolet	775
Sedan	765	De Luxe Sedan	795

DURANT 4-cyl. 107 W. B.

2-dr. Sedan	595	De L. Roadster	675
Coupe	595	4-dr. Sedan	695
Roadster	595	Spt. Roadster	1,296

DURANT—60. 109 W. B.

Coupe	755	De L. Roadster	845
Roadster	755	De L. Cabriolet	895
2-dr. Sedan	765	De L. 4-dr. Sed.	935
4-dr. Sedan	845		

DURANT—6-cyl. "65." 110 W. B.

Touring	795	Cabriolet (R.S.)	1,045
2-dr. Sedan	975	Sedan	1,075
Coupe (R.S.)	975	4-dr. Brough'm	1,175
Sp. Road (R.S.)	1,025		

DURANT—6-cyl. "75." 119 W. B.

4-dr. Sedan	1,385	4-dr. Brough'm	1,550

ELCAR—6-cyl. 117 W. B.

2 Roadster	995	4 Coupe	1,165
5 Touring	1,075	4 Lan. Rdr(RS)	1,165
5 4-dr. Cl. Sed.	1,095	5 4-dr. Sedan	1,195
4 Road'r (R.S.)	1,145		

ELCAR—120. 134 W. B.

5-7 Std. Tour.	2,465	7 Stand Sedan	2,645
5 Stand. Sedan	2,465		

ELCAR—120. 127 W. B.

4 Roadster	1,995	5 Princess Bro.	2,295
4 Coupe	2,295	5 Princess Sed.	2,295

ELCAR—8-82. 123 W. B.

4 Roadster	1,695	5 Stand. Sedan	1,695
5 Touring	1,695	5 Princess Sed.	1,895
4 Coupe	1,695		

ELCAR—8-78. Standard. 123 W. B.

4 Roadster	1,395	4 Coupe	1,395
5 Touring	1,395	5 Sedan	1,395

ELCAR—8-78. Royal. 123 W. B.

5 Sedan	1,495	5 Touring	1,495
4 Coupe	1,495	4 Roadster	1,495

ERSKINE—6-cyl. 109 W. B.

5 Touring	835	Sedan	945
Club Sedan	860	4 Royal Cabriolet	995
2 Cabriolet	875	Royal Sedan	1,045

ESSEX—6-cyl. 110½ W. B.

5 Coach	735	5 Sedan	795
Coupe	745	Spt. Roadster	850
Coupe (R. S.)	775		

FALCON-KNIGHT—6-cyl. 109½ W. B.

2-dr. Sedan	995	4-dr. Sedan	1,095
Coupe	1,045	G. G. Speedster	1,195

FORD—Model A. 103½ W. B.

Roadster	385	Tudor Sedan	495
Phaeton	395	Coupe	550
Pickup Open Cab.	445	Sport Coupe	550
Pickup Cl. Cab.	495	Fordor Sedan	625
Business Coupe	495		

FRANKLIN—6-cyl. 119 W. B.

Coupe	2,625	Oxford Sedan	2,790
Victoria Broug.	2,760	Sport Sedan	2,910
Sedan	2,790	Conv. Coupe	2,850

FRANKLIN—6-cyl. 128 W. B.

Spt. Runabout	2,975	Oxford Sedan	2,980
5 Spt. Touring	2,975	7 Touring	3,060
Sedan	2,980	Limousine	3,080

FRANKLIN—Custom. 128 W. B.

5 Con. Sedan	4,600	5-7 Town Cab.	6,400
5 Spt. Sedan	5,800	E. D. Cabriolet	6,400
5-7 Town Car	5,800		

GARDNER—Series 120. 120 W. B.

Sport Sedan	1,295	Coupe	1,495
Roadster	1,395	Sedan	1,595

GARDNER—Series 125. 125 W. B.

Roadster	1,695	Victoria	1,895
Coupe	1,795	Sedan	1,895
Brougham	1,875		

GARDNER—Series 130. 130 W. B.

Roadster	2,195	Victoria	2,395
Coupe	2,295	Sedan	2,395
Brougham	2,375		

GRAHAM-PAIGE—"610." 110½ W. B.

2 Coupe	860	5 Sedan	875

GRAHAM-PAIGE—614. 114 W. B.

4 Coupe	1,275	4 Spt. Phaeton	1,295
5 Sedan	1,295		

GRAHAM-PAIGE—"619." 119 W. B.

4 Coupe	1,575	4 Spt. Phaeton	1,595
5 Sedan	1,595		

GRAHAM-PAIGE—"629." 129 W. B.

5 Sedan	1,985	7 Sedan	2,110
5 Town Sedan	2,085	Cabriolet (R.S.)	2,185
5 Coupe	2,085	4 Coupe (R.S.)	2,185

GRAHAM-PAIGE—835. 135 W. B.

5 Sedan	2,285	7 Phaeton	2,410
5 Town Sedan	2,385	Cabriolet (R.S.)	2,485
5 Coupe	2,385	4 Coupe (R.S.)	2,485
7 Sedan	2,410		

HUDSON—6-cyl. 118 W. B.

Coach	1,250	Coupe (R.S.)	1,295
Roadster	1,295	Sedan (W.B.)	1,325

HUDSON—6-cyl. 127 W. B.

Stand. Sedan	1,450	Cust. Victoria	1,650
Cus. Lan. Sed.	1,650	7 Cust. Sedan	1,950

HUPMOBILE—Century 8. 120 W. B.

2-dr. Sedan	1,825	Roadster	1,915
4 Coupe	1,865	7 Phaeton	1,935
4-dr. Sedan	1,875	Cabriolet	1,955
5 Phaeton	1,905		

HUPMOBILE—Century 8. 130 W. B.

Sedan (D.W.)	2,385	Limous. (D.W.)	2,515
Sedan (Cus. D.W.)	2,470	Limousine (Cus. D.W.)	2,600

HUPMOBILE—Century 6. 114 W. B. Standard Models

5 2-dr. Sedan	1,345	2 Sports (R.S.)	1,435
4 2-dr. Coupe	1,385	7 Phaeton	1,455
5 4-dr. Sedan	1,395	2 Cabriolet	1,475
5 Phaeton	1,425		

JORDAN—Cross Country. 6-cyl. 107 W. B.

4 Sport Tour	1,295	4 Tomboy Coupe	1,395
5 Sedan	1,395	B. B. Touring	1,495

JORDAN—Air Line. 8-cyl. 116 W. B.

5 Sedan	1,995	2 C. Coupe(RS)	1,995
5 2-d. Lan. Br.	1,995		

KISSEL—White Eagle. Model 73

4-dr. Bro. Sed.	1,595	Sedan	1,695
All Year Coupe		Coupe Roadster	
Rdstr (F.T.)	1,695	(Solid Top)	1,695

KISSEL—White Eagle. Model 95.

4-dr. Br. Sed.	1,995	7 Touring	2,095
Sedan	2,095	Speedster	2,195
All Year Coupe		Tourster	2,195
Rdstr (F.T.)	2,095	A. Y. Broug.	2,595
Coupe Roadster (Solid Top)	2,095	7 Sedan	2,595

KISSEL—White Eagle. Model 126

All Year Brou.	3,185	4-dr. Brou. Sed.	3,275
Coupe Roadster (Solid Top)	3,185	Speedster	3,275
All Year Coupe		Tourster	3,275
Rdstr (F.T.)	3,185	7 Sedan	3,795
		Berline Sedan	3,885

LA SALLE—Fisher. 8-cyl. 125 W. B.

4 Phaeton	2,295	4 Spt. Phaeton	2,875
2 Roadster	2,345		

LA SALLE—Fisher. 8-cyl. 134 W. B.

5 Family Sed.	2,450	5 Town Sedan	2,675
2 Coupe	2,495	5 Cv. Lan. Cab.	2,725
Conv. Coupe	2,595	7 Sedan	2,775
5 Sedan	2,595	7 Imperial	2,875
5 Coupe	2,625		

LA SALLE—Fleetwood. 8-cyl. 125 W. B.

Tr. Town Cab.	4,800		

LA SALLE—Fleetwood. 8-cyl. 134 W. B.

Tr. Town Cab.	4,900		

LINCOLN—8-cyl. 136 W. B.

4 Coupe	4,600	4 Sedan	4,800
2 Roadster	4,600	5 Sedan	4,800
4 Spt. Phaeton	4,600	7 Sedan	5,000
7 Touring	4,600	7 Limousine	5,200

LINCOLN—8-cyl. 136 W. B.

Club Roadster	4,800	Cabriolet	6,400
2 Coupe	5,000	A. W. Brough	7,160
Berline	5,500	Le Baron Cabri.	7,600
Limousine	6,000	Holbrook Cabri.	7,200
Brougham	6,500	Col. Cabriolet	7,300
6 Berlin. Land.	6,500		

LOCOMOBILE—8-70. 122 W. B.

4 Vic. Coupe	1,995	5 De L. Sedan	2,445
5 Sedan	1,995	5 De L. Broug.	2,445
5 Brougham	1,995		

LOCOMOBILE—8-80. 130 W. B.

5 Sedan	2,650	7 Sedan	3,150
Vict. Coupe	2,650	7 Sub (140wb)	3,300
5 Brougham	2,700	7 Touring	3,300
4 Coll. Coupe	3,000	5 Vic. Sedan	5,350
4 Phaeton	3,100	N. C. Cabriolet	6,950

LOCOMOBILE—6-cyl. "90." 138 W. B.

4 Sportiff	5,900	7 Sub. Sedan	7,500
5 Vic. Sedan	7,300	7 Town Broug.	7,500
7 Touring	6,000	7 Non Coll. Cab.	7,500
5 Vic. Sedan	7,450	7 S.C. Cabriolet	7,750

LOCOMOBILE—Model 48. 142 W. B.

7 Touring	9,600	7 Town Broug.	12,500
Sportif	9,600	5 Vic. Sedan	12,500
Roadster	11,000	7 E. D. Lim.	12,500
7 Tour. Lim.	12,500	7 Cabriolet	12,500

Recent price changes in bold face

MARMON—8-cyl. 68. 114 W. B.

5 Sedan	1,465	2 Roadster	1,565
2 Coupe	1,465	6 Speedster	1,625
4 Victoria	1,520		

MARMON—78. 120 W. B.

5 Sedan	1,965	4 Victoria	2,065
2 Coupe	1,965	6 Speedster	2,065
2 Roadster	1,965		

MOON—6-62. 110 W. B.

Roadster	1,195	4-dr. Sedan	1,345
2-dr. Brough.	1,295		

MOON—6-72. Royal. 120 W. B.

Royal Roadstr.	1,395	4-dr. Sedan	1,595
Cabriolet	1,495	Victoria Coupe	1,695
Petite Sedan	1,595		

MOON—6-72. Standard. 120 W. B.

Roadster	1,395	4-dr. Sedan	1,495
2-dr. Brough.	1,445		

MOON—8-75. 125 W. B.

Royal Roadstr.	1,795	Col. Cabriolet	1,995

MOON—8-80. 125 W. B.

Cabriolet	2,095	Victoria Coupe	2,195
Petite Sedan	2,195	7 Sed. (137wb)	2,395
Full Sedan	2,195		

NASH—Standard—6-cyl. 112¼ W. B.

2-dr. Sedan	885	4-dr. Sedan	955
Coupe	885	Cabriolet (R.S.)	955
Phaeton	935	4-dr. D.L. Sedan	995

NASH—Special Six. 6-cyl 116 W. B.

Coupe	1,245	4-dr. Sedan	1,345
Phaeton	1,250	Cabriolet (R.S.)	1,345
2-dr. Sedan	1,260	Victoria	1,345
Coupe (R.S.)	1,315		

NASH—Advanced Six. 6-cyl. 121 W. B.

2-dr. Sedan	1,480	4-dr. Sedan	1,550

NASH—Advanced Six. 6-cyl. 130 W. B.

7 Phaeton	1,650	Ambas. Sedan	1,925
Cabriolet(R.S.)	1,660	7 Sedan	1,990
Coupe (R.S.)	1,775	7 Limousine	2,190

OAKLAND—6-cyl. 117 W. B.

Roadster	1,145	Standard Sedan	1,245
2 Coupe	1,145	Cabriolet	1,265
2-dr. Sedan	1,145	Landaulet	1,375
Phaeton	1,145		

OLDSMOBILE—6-cyl. 113½. W. B.

2-dr. Sedan	925	Sport Roadster	995
Coupe	925	4-dr. Sedan	1,025
Sport Coupe	995	Landau	1,085
Sport Phaeton	995		

OLDSMOBILE—6-cyl. 113½ W. B.

DeL. Roadstr.	1,145	DeL. 4-dr. Sed.	1,175
DeL. Phaeton	1,145	DeL. Landau	1,235
DeL. S. Coupe	1,145		

PACKARD—6-26. 8-cyl. 126 W. B.

5 Sedan	2,435	2 Con. Coupe	2,585
2 Coupe	2,510		

PACKARD—6-33. 8-cyl. 133 W. B.

2 Runabout	2,535	5 Club Sedan	2,735
5 Phaeton	2,535	4 Coupe	2,735
7 Touring	2,635	7 Sedan-Lim.	2,835
7 Sedan	2,735		

PACKARD—6-40. 8-cyl. 140 W. B.

2 Runabout	3,175	4 Coupe	3,750
5 Phaeton	3,175	5 Club Sedan	3,750
2 Coupe	3,250	7 Sedan	3,750
7 Touring	3,275	7 Sedan-Lim.	3,850
2 Con. Coupe	3,350		

PACKARD—6-45. 8-cyl. 145 W. B.

2 Runabout	4,585	5 Coupe	5,735
7 Touring	4,585	5 Club Sedan	5,785
5 Phaeton	4,585	7 Sedan	5,785
6 Spt. Phaeton	4,935	7 Sedan-Lim.	5,985
2 Coupe	5,385		

PEERLESS—6-cyl. "81." 116 W. B.

5 Sp. Phaeton	1,545	5 Stand. Sedan	1,595
2 Coupe	1,595	7 Sp. Phaeton	1,595
4 Victoria	1,595		

PEERLESS 6-cyl. "91." 120 W. B.

5 Spec. Sedan	1,695	5 Sedan	1,895
Vict. Coupe	1,895	7 Sedan	1,995
Roadsr. Coupe	1,895		

PIERCE-ARROW—"81." 130 W. B.

5 Cl. Broughm	2,475	4 Sedan	2,750
2 Runabout	2,600	7 Sedan	2,850
2 Coupe (no rumble seat)	2,650	4 Conv. Coupe	2,950
4 Touring	2,700	4 Coupe De L.	2,950
2 Coupe (R.S.)	2,750	7 Inc. Dr. Lim.	2,950
5 Club Sedan	2,750	Fr. Op. Brou.	7,750

PIERCE-ARROW—6-cyl. "36." 138 W. B.

7 E. D. Limo.	5,875	Coupe-Sedan	6,375
7 Sedan	5,875	4 Vest. Sedan	6,375
Runabout	5,875	4 4-dr. Sedan	6,375
4 Touring	5,875	4 Sed. Landau	6,600
7 Touring	5,875	4 E. D. Landau	6,600
7 E. D. Lan.	6,000	French Limo.	7,500
7 Sed. Landau	6,000	French Landau	8,000
3 Coupe	6,375		

PLYMOUTH—4-cyl. 107 W. B.

Roadster (R.S.)	675	Touring	695
Coupe	685	DeL. Coupe (RS)	735
2-dr. Sedan	700	4-dr. Sedan	735

PONTIAC—6-cyl. 110 W. B.

2-dr. Sedan	745	Sport Cabriolet	795
Sport Roadster	745	4-dr. Sedan	825
Coupe	745	Sport. Lan. Sed.	875
4 Spt. Phaeton	775		

REO—6-cyl. 121 W. B.

2 Spt. Coupe	1,625	4 Victoria	1,795
5 Brougham	1,645	5 Sedan	1,845
Roadster	1,685		

STEARNS-KNIGHT—6-80. 126 W. B.

Cab. Roadster	2,195	5 Sedan	2,195
Cl. Coupe Sed.	2,195		

STEARNS-KNIGHT—6-80. 134 W. B.

5 Coupe	2,345	7 Limousine	2,645
7 Sedan	2,345		

STEARNS-KNIGHT—8-90. De Luxe, 137 W. B.

Roadster	5,500	5 Coupe	5,500
2 Coupe	5,500	5 Sedan	5,500
Cab. Roadster	5,500		

STEARNS-KNIGHT—J 8-90. De Luxe. 145 W. B.

7 Touring	5,500	7 Limousine	5,800
7 Sedan	5,600		

STUDEBAKER—Dictator. 113 W. B.

Club Sedan	1,185	7 Touring	1,325
Sedan	1,265	Victoria	1,345
2 Bus. Coupe	1,265	4 Royal Cabr.	1,395
5 Touring	1,265	Royal Sedan	1,395

STUDEBAKER—Commander. 121 W. B.

Sedan	1,495	Regal Sedan	1,665
Victoria	1,625		

STUDEBAKER—President 8. 121 W. B.

Sedan	1,685	4 State Cabr.	1,850
State Sedan	1,850	State Roadster	1,850
State Victoria	1,850		

STUDEBAKER—President 8. 131 W. B.

7 Sedan	2,085	7 State Sedan	2,350
5 State Sedan	2,250	Limousine	2,450
4 Cabriolet	2,250	7 State Tour	2,485

STUTZ—Custom. 8-cyl. 131 W. B.

2 Speedster	3,495	4 Speedster	3,595
Vic. Coupe	3,495	2 Cab. Coupe	3,695
2 Coupe	3,495	2 B. H. Speed.	4,895
5 Sedan	3,570	4 B. H. Speed.	4,945
5 Brougham	3,570		

STUTZ—Custom. 8-cyl. 145 W. B.

7 Speedster	3,895	7 Sedan Lim.	3,995
7 Sedan	3,895	5 Limousine	4,095
5 C. C. Spe

S. A. E. Production Meeting Closes at Detroit

More Than 700 Members Are Attracted by Program

(Continued from Page 1)

nearly at an end the hall was comfortably filled. Under the chairmanship of V. P. Rumely, the program of papers dealing with material handling was heard and discussed. Mr. Rumely reported progress in the work of his sub-committee on this subject, and the first formal paper was read by Norman H. Preble of Mechanical Handling Systems, Inc., Detroit. His talk was illustrated by slides showing the methods of routing and handling material in the Pontiac assembly plant of the Oakland Motor Car Company and went into considerable detail on methods used. The matter covered included visualization of the handling of bodies from the plant of the Fisher Body Corporation, which is about a quarter-mile distant from the plant of the Oakland company.

Discussion on this paper brought out the methods by which the various colored bodies and wheels and fenders to match were brought to the proper place in the assembly lines, so as to prevent confusion and error. It was stated that in the majority of cases the day's work is laid out in advance and that any deviations are reported to the various departments sufficiently in advance to permit them to alter their plans in accordance with the changed program.

C. E. Broome's paper on "Selection of Conveyor Power Units" started a lively discussion as to the relative merits of herringbone, worm and spur gears. Mr. Broome, in answer to a question, said that he had found that the worm gear type was the most generally satisfactory for use with high speeds and light loads. His paper was illustrated with slides, showing the various types of gears and their operation in connection with conveyor power units. These are used as speed reducers and he explained why careful selection of the proper type in each case was essential. His original paper was one of the shortest read at the convention.

J. B. Webb of J. B. Webb Company, Detroit, was the last speaker at the morning session, with a paper on conveyor-chain curvature. He warned the audience that the subject was a difficult one to handle, since there are so many phases to each of the individual problems involved. In the discussion, he laid emphasis on the value of close spacing of the trolleys, stating that more trolleys, of a less expensive type, were decidedly economical, as compared with a system utilizing a spacing that put too much weight on the individual trolley, calling for the heavier and more expensive construction of the unit. Mr. Webb also urged the advantage of proper lubrication and frequent inspection in avoiding trouble in conveyor chains.

Attendance at the afternoon session was rather small, though the subject, power transmission, was evidently of the keenest interest to the audience. There were only two papers, one by W. W. Nichols of D. P. Brown & Co., and one by A. C. Woodbury of the editorial staff of the S. A. E. It developed at the session that it may be a future practice at similar meetings to limit the actual time of presentation of papers to ten minutes each and devote the bulk of the time at the disposal of the meeting to discussions.

Mr. Nichols talked on the relation between power transmission engineering and production and cost, illustrating his remarks with slides and diagrams of installations and operations.

In the discussion that followed his paper, several examples were given of important savings that had been effected in practice as the result of a proper knowledge of power transmission. One member had a set of charts showing that in one plant belting costs had been reduced 50 per cent. by the application of right principles in selecting the equipment.

Additional report was made that in a plant manufacturing motors a belting cost of $1 per motor produced had been cut to 23 cents, with a resulting saving of $1,000 a day.

Still another engineer said that in one case an annual saving of $100,000 had been the result of intelligent survey of power transmission conditions and the installation of such equipment as the survey showed to be proper for the individual case.

Mr. Nichols started trouble with one chart, which was designed to show the amount of horse power required to remove a given amount of material. This gave rise to discussion on both sides, some of the audience siding with the speaker and others taking the ground that without taking all known factors into account, such charts are of little or no value.

Mr. Woodbury's paper was presented without slides, the illustrations and diagrams being confined to those of the pre-print. His talk dealt with the industrial applications of chain drives, and there was considerable discussion following it. F. L. Morse of the Morse Chain Company, the dean of chain drive makers, was an interested party to the discussion as to the relative merits of various types of chains used not only in the automobile itself but in the industry as a whole. He traced the history of the chain drive back to the time of Leonardo Da Vinci and said that the principle of the silent chain drive was brought out by a clerk in the Bank of England as long ago as 1865. Mr. Morse added that belting had come into general use in industry as recently as 1835, so that it was actually not much older than the silent chain system.

Prefacing the Friday evening session, Chairman Guy Hubbard read a report on the production meetings of the society and predicted that they would grow in importance, in keeping with the increasing importance of production as a chief consideration of the industry.

L. W. Haskell's paper on "The Relation of Time Study to Manufacturing" led to a series of questions on details in laying out and executing time studies generally. There was considerable difference of opinion expressed by the members as to the relative merits of the various systems in use, and at one point in the argument one time study man brought down the house by announcing emphatically that he knew more about eggs than any hen that ever lived. This statement was occasioned by a discussion as to whether a mechanic or a trained observer was the better fitted to make a time study of an operation. The gentleman who described the hen's knowledge of her product was an advocate of the trained observer rather than the general mechanic, in securing reliable data on the problem.

It was brought out that time study, properly considered, may have an influence much greater than that exercised in productive labor alone, extending to savings in investment in new equipment or even new buildings.

Paul Geyser of the General Motors Truck Company had traveled all the way from Atlanta to read his paper on "Interpretation of Production Records." He showed by comparative charts that more than substantial savings had been effected by the company through a system of keeping the sub-executives informed from month to month as to the expenses incurred in their departments. Mr. Geyser laid stress on the theory that when a man's authority is commensurate with his responsibility he is almost bound to do better work, and he cited the charts as a means of giving the foremen and some other department executives a feeling that they were a responsible part of the organization and that they were authorized to utilize means to operate their departments more efficiently and more economically.

The concluding paper of the evening, mentioned earlier, was heard with very close attention as Mr. Sieger described some of the remarkable results obtained by the use of carboloy as a cutting tool. "Formerly unsolved problems in working highly resistive metals," said Mr. Sieger, "have been solved by this new form of steel. We realize that we have a great deal to learn about it still, but what has already been done convinces us that we have something new and of revolutionary value to the industry.

"The material is very hard, but it is not overly strong, and some caution must be used in dealing with it. It is hard enough to scratch a sapphire and to do many things that have been previously possible only with the use of a diamond cutter. Bakelite, for example, is easily cut, using the same speed as is standard in the use of diamonds. We have had one experience with cutting 250,000 holes in bakelite with carboloy, where the average record of a hard steel tool was 3,000 holes before the steel wore out. It cuts mica readily. Aluminum and its alloys, which usually contain some hard spots, offer considerable difficulty in working, as you know, and the tools used on it ordinarily wear out rapidly. This is not the case with carboloy.

"To turn a thread on glass is more or less of a stunt, but it is an accomplishment, none the less. And we have been successful in cutting threads and otherwise machining porcelain. Among other metals difficult to machine is the familiar Hatfield manganese steel, but even this yields to carboloy. We have cut hard cast iron, with scale, at the rate of 300 feet per minute. In practice, we have found it well to increase the cutting speed rather than the depth of the cut, for good results. We have had some failures, but these have not been the fault of carboloy material."

Clayton R. Burt, vice-president of Pratt & Whitney, closed the discussion with some description of widdia metal, a German product, which, he said, possessed many of the characteristics described as possessed by carboloy.

Some interesting points were brought out in papers and discussions at the opening sessions of the S. A. E. production meeting on Thursday.

G. W. Blackinton, chairman of the sub-committee on processes and equipment, outlined briefly the topics recommended by his committee for consideration and discussion at later meetings. These are to include a study of new types of machining by the Packard methods, and the use of diamond point tools in the industry.

Following the paper read by Prof. John Younger of Ohio State University, there was a brief discussion. President W. G. Wall of the S. A. E. paid the speaker a high tribute and asked whether or not the automotive industry is now making as full use of automatic machinery as possible. Chairman Oberg remarked that in other industries it had required as much as twenty-five years to develop the automatic machines used by them, and indicated that there seemed little likelihood that the automotive industry could expect full automatic equipment in much less time.

The paper read by L. A. Baron, controller of the Stutz Motor Car Company, was very comprehensive. It covered the subject in detail and led to a number of questions as to how the speaker would himself handle specific problems of accounting in the industry, with its variable factor of longevity in the different types of machinery and equipment used under differing types of service.

The paper of A. B. Cox, on "Integral Contact Gearing," was also illustrated with slides, showing the process of gear-making, on which he holds the patents. Mr. Cox was formerly on the faculty of the University of Pittsburgh, but is now in private practice. His paper was brief, but it led to a discussion as to why the gears discussed in his and Mr. Tanner's paper should all be of the straight, involute type, instead of composite forms. Chairman Tenney advanced the idea that the present engineering practice tends to concentrate on methods of improving the standard gears, for which the industry has Browne & Sharp to thank since the beginning. Mr. Cox added that he saw no necessity for going to the composite types, since the standard gears, or some modification of them, are so generally adaptable.

OTHER S. A. E. PAPERS ON PAGES 8, 9, 10

Geyser Sees Production Record Analysis as Guide

Paul Geyser of the General Motors Truck Company, whose subject at the S. A. E. session in Detroit was "Interpretation of Production Records," discussed the use of records as a basis of business analysis as a guide for forecasting future probabilities. He said in part:—

"The essential difference between old and new production methods lies in the gathering of records and the putting to useful purpose of the information thus obtained. The record system represents the difference between knowledge and guesswork.

The Basis of Business Analysis

"Records furnish a basis for business analysis. We take it for granted that exact and detailed knowledge of the financial condition of a business is essential.

"It is important that the executives of a plant shall be able to analyze the work under way and be able to present an operating statement of production efforts.

"Cost accounting based on plant records does not mean simply the discovery of how much production costs. Its greater service is to reveal where the costs have accrued, whence unexpected profits have come and where unexpected losses have occurred, so that the management can strengthen weak points, correct defects and make the productive efficiency of the plant increasingly more satisfactory and dependable.

"A score of elements may contribute to the lack of success in the operation of a department, and to remedy the condition the facts must be gathered in a detailed and systematic way before their relationship to the situation can be established.

"Record keeping makes possible a thorough understanding of every phase of the work that the production engineer is directing.

"What happened last week or last year is likely to happen again. The man who is willing to accumulate enough details of actual happenings in his work over a sufficient time can almost definitely foresee what is likely to confront him and be prepared to meet the emergencies.

"Test your methods of work by securing facts relating to them. What do the results show in actual figures as compared with some other methods? When you buy a machine, you buy it on its record. You want to know what it does and how. You can test your methods in the same way. Test your methods of work by the records you keep in your plant. Study them to see what lies back of them and you will find their weaknesses.

"First, discover exactly the kind of waste and the place where it occurs. Second, answer the question of how much waste there is, in dollars and cents. The third step is to discover why the waste occurs.

"When you know where the waste is, how much it is, and why it occurs, the question of eliminating it is a very simple one, but the questions in the first two of these steps can be surely answered only by means of an exact and complete record of the conditions in your plant. Your records can be made to give you such information.

"Finally, your records can and should be used to stimulate the personal efficiency of the ordinary worker and department. Stimulate efficiency by bringing before the men facts that bear directly upon their work; by establishing standards of individual accomplishment and comparing with those standards the actual accomplishment of the individual."

Sturdy planks in a sound platform

The Willys-Overland line stands for superior quality of materials, expert craftsmanship throughout, performance that challenges any car on the road and dollar-for-dollar value—a full return for every dollar your customer spends.

America's motorists have been enthusiastic in their endorsement of this platform. Their nation-wide approval has resulted in record-breaking sales of the Whippet Four, the Whippet Six and the Willys-Knight Six—making 1928 the greatest year in Willys-Overland's history.

WILLYS-OVERLAND, INC., TOLEDO, OHIO
WILLYS-OVERLAND SALES CO., LTD., TORONTO, CAN.

FOURS WHIPPET SIXES
WILLYS-KNIGHT SIX

Broome Discusses Selecting Conveyor Speed Reducers

Problems of selecting speed reducers for conveyors were discussed at the production material-handling session of the meeting of the Society of Automotive Engineers in Detroit Friday by C. E. Broome, of Gears and Forgings, Inc., Rockford, Ill. Mr. Broome said in part:—

"The labor savings that have been accomplished through material-handling equipment are many, and for this reason conveyor systems are in universal use in automotive plants.

"The selection of the correct driving units for conveyors must be controlled in virtually all cases by a study of the conditions under which the conveyor is to operate, the space limitations and the loads to be carried.

"With the exception of gravity systems, all conveyors require some method of power transmission. The speed of the conveyor, or of the material, varies infinitely, and for this reason some means is required to control the speed.

"Speed reducers of the inclosed type with gears and bearings operating in a bath of oil, offer means of power transmission that promise the minimum maintenance. Limitations of space, efficiency and adaptability virtually eliminate the use of fofpen gearing.

COMPOUND-GEAR UNITS ECONOMICAL

"An analysis of the various types of reducer shows that the spur-gear compound reducer has certain advantages for ratios within its limits and the cost of these units within these limits may be less than that of other types. They usually are built with input and output shafts parallel.

"The herringbone-gear unit, when applicable, is the ultimate refinement of the single and compound types of gear reducer. It provides smooth drive, with the assurance of uniform angular velocity. This type of reducer has solved the problem of driving the rolls of sheet mills. Reducer sof this type are usually not so compact and its usually is not practicable to balance the design fofr fhte higher ratios.

RIGHT-ANGLE DRIVES ARE COMPACT

"The worm-gear unit is an ideal type of right-angle drive and is being produced by several manufacturers as a very efficient drive. Reliable information regarding efficiency and design is now available, and a steady increase in the popularity of the worm-gear speed reducer may be expected. Minimum and maximum ratio limitations in this type of unit for most successful operations are about 8 to 1 and 50 to 1.

"The unit operates to best advantage when coupled directly to the motor. Worm-gear units have been used extensively as head-shaft drives in elevator-type conveyors because of the irreversible feature. Irreversibility was an inherent quality only because of inefficient manufacture and inefficient bearings, and belief that it still exists is more or less of a fallacy with the present quality of drive. Brakes should also be used with it and undoubtedly will be found necessary with an efficient reducer.

"The bevel-gear reducer is a type of right-angle drive that is very adaptable in ratios between 2 to 1 and 8 to 1. If a higher ratio is desired, it is necessary to supplement the bevel gears with spur gears. Different manufacturers are furnishing this type of drive in ratios up to 200 to 1.

CONCENTRIC-SHAFT REDUCERS FAVORED

"A spur-gear concentric shaft speed reducer may be composed of a compound series of spur gears or may utilize an internal gear. It may or may not be of the planetary type. This concentric shaft type has found the greatest favor in the conveyor field.

"The driving pinion of the compoung type engages with at least three gears, distributing the load and making possible a very compact design. The non-planetary internal gear type has the idler or intermediate pinion shafts held in a fixed position by the frame, and the internal gear ring is mounted on bearings and drives the slow-speed shaft. The planetary internal gear type has a fixed internal gear ring and the slow speed shaft is driven from the plate carrying the idler or planet gears.

"A common hook-up for conveyors is from the motor to a variable speed transmission and from the variable unit to the speed reducer by silent chains, and then through a roller chain from the reducer to the head-sprocket of the conveyor. The concentric-shaft type of reducer lends itself admirably to installations of this kind.

Standardization and Adaptability

"Several other things besides type are, however, to be taken into consideration in choosing a speed reducer for a conveyor drive. In a field in which the product is so highly standardized as in the automotive industry, it is appropriate that plant equipment shall be standardized, for interchangeability of parts as well as of complete units.

"The load to be carried on any conveyor can be expressed in inch-pounds torque at the conveyor head-shaft, and the reducer should be chosen according to this figure. An analysis of design of a well constructed speed-reducer usually shows the slow-speed shaft to be the weakest member; consequently the torque capacity in inch-pounds at this point determines the load-carrying capacity of the unit.

"The load in inch-pounds torque can be translated through the gear ratios to give the motor requirement, taking into consideration whatever efficiency losses there may be.

"Speed reducers sometimes are given a higher rating for intermittent loads than for continuous duty; but, if they are used for starting under load, they should be chosen under the same rating for intermittent as for continuous service. If peak loads or jams are likely to occur, an allowance should be made for them.

"When it is necessary to change the speed of the conveyor, it is advisable in nearly all cases to make the change at the input end rather than to change the drive between the reducer and the conveyor. This is because a more liberal factor is used on the design of the high-speed end than in the rest of the reducer. Numerous breakdowns have occurred in practice from placing on the slow-speed shaft a larger sprocket than the original design of the installation required.

AVAILABILITY FOR VARIOUS USES

"Another fact to be taken into consideration in selecting a reducer is that its life is likely to exceed the period that any certain procedure of operations will be in use. Therefore the reducer chosen should be adaptable to other installations with the minimum of constructional change.

"Further, it is desirable to select reducers of a type and design that can be used in as many different installations as possible. This will permit the carrying of the minimum stock of parts and units for repair and replacement.

LUBRICATION AND PURCHASING DATA

"The reducer chosen for any application must be easily lubricated and the drain plugs should be accessible and in a position such that the unit can be drained into a receptacle, not on the floor. Oil level cups, plugs or gauges should be located so that the oil level can be observed and checked easily.

"The greater the number of factors taken into consideration in the choice of a correct power unit, the more it will be apparent that some one type of construction will give the most efficient service.

"The manufacturers of equipment of this type should be given full information as to the installation, such as torque at head shaft in inch-pounds; ratio of reduction and method of transmission desired between reducer and head-shaft; input and output speed in revolutions per minute, and possible peak loads. If the reducer is to be mounted in a location where the temperature differences are considerable, this should be noted.

"If these points are kept in mind, the recommendations made will be for the best equipment that the various manufacturers have to offer for the particular problem, and the buyer can be assured that, from those recommendations, it will be a simple matter to find the one power-unit especially adaptable to his particular installation."

POLETTI BROS. GARAGE FIRE DAMAGE $150,000

Union City, N. J., Nov. 24.—Fire, started by the backfire of a de luxe bus, did $150,000 damage to the Poletti Brothers Garage, 23d Street, this city. Twenty-four vehicles, including four buses, were destroyed. The automobile showroom of Arthur Lapham, Oakland-Pontiac dealer, was menaced by the flames. The six cars on display were pushed out of the danger zone. It is said that the loss is covered by insurance.

BUILDING ACTIVITIES IN OCTOBER SHOW DECLINE

New York, Nov. 24.—October building activities throughout the country continued to show a downward trend, but not quite as pronounced as was reported between May and September, according to S. W. Straus & Co. The October total of building permits in 585 towns and cities was $293,006,602, compared with $296,172,437 in October, 1927, a loss of 1 per cent. The September total in these cities was $272,564,200. The October gain over this figure was 8 per cent.

Passenger Car Equipment and Accessories

Name and Model	Speedometer	Clock	Fuel Gauge	Lock	Spark Plugs	Battery	Heat Indicator	Cig. Lighter	Smoking Set	Vanity Set	Make of Body Finish Used	Stop Light	Parking Light	Windshield Wings	Heater	Front Bumper	Rear Bumper	Wire Wheels'	Shock Absorber
Auburn 115	Ste	—	K-S	Ele	Cha	USL	Moto-M	Cas	GR	—	Mur	Ind	In	*Troy	*Gla	Balc	Balc	Day	cLov
Auburn 88	Ste	—	K-S	Ele	Cha	USL	Moto-M	Cas	GR	—	Mur	Ind	In	*Troy	*Gla	Balc	Balc	Day	cLov
Auburn 76	Ste	—	K-S	Ele	Cha	USL	Moto-M	—	—	—	Mur	Ind	In	*Troy	*Gla	Balc	Balc	Day	cLov
Buick 115	AC	—	Gro	Her	AC	Ex	AC	Cuno	Fis	Fis	Duco	D-R	D-R	—	—	—	—	Buffalo	cLov
Buick 120	AC	—	Gro	Her	AC	Ex	AC	Cuno	Fis	Fis	Duco	D-R	D-R	—	—	—	—	Buffalo	cLov
Buick 128	AC	—	Gro	Her	AC	Ex	AC	Cuno	Fis	Fis	Duco	D-R	D-R	—	—	—	—	Buffalo	cLov
Cadillac	AC	Jag	Nag	D-R	AC	Ex	AC	Cas	Tern	Tern	Duco	Own	Hal	Del	*Kel	USE	USE	Buffalo	cLov
Chandler 65	Ste	—	Moto-M	Ele	AC	Pre	Moto-M	—	†GR	—	Ditz	Cor	Cor	—	—	Ster	Ster	K-H	*Lov
Chandler Big 6	Ste	—	Moto-M	Ele	AC	Pre	Moto-M	—	GR	GR	Ditz	Cor	Cor	—	Per	Ster	Ster	K-H	*Lov
Chand. Royal 85	Ste	—	Moto-M	Ele	AC	Pre	Moto-M	—	GR	GR	Ditz	Cor	Cor	—	Per	Ster	Ster	K-H	*Lov
Chand. Royal 75	Ste	—	Moto-M	Ele	AC	Pre	Moto-M	—	GR	GR	Ditz	Cor	Cor	—	Per	Ster	Ster	K-H	Lov
Chevrolet AA	AC	—	Roc	*Ign	AC	USL, Ex	—	—	Fis	—	Duco	D-R	—	—	Own	Own	Own	—	—
Chrysler 75	AC	—	Moto-M	Ele	Cha	Wil	Moto-M	—	—	—	DucoVal	Hal	—	Kok	—	Ste	Ste	—	Lov
Chrysler 65	NE	Sha	Moto-M	Sha	AC	Wil	—	—	—	—	DucoVal	Hal	—	Kok	—	Ste	Ste	—	Lov
Chrysler 80	AC	Ster	Moto-M	Ele	Cha	Wil	Moto-M	Cas	—	Cas	DucoVal	Hal	—	Kok	Bov	Ste	Ste	Buffalo	cHou
Davis 99	Ste	—	Moto-M	Joh	AC	Wil	Moto-M	—	GR	GR	Duco	Cor	—	—	Per	Balc	Balc	—	cHex
Dodge Senior 6	NE	—	Moto-M	B&S	Cha	Wil	Moto-M	—	GR	ElGR	—	Cor	Ind	Cor	Ind	—	—	CG	CG	—	Lov
Dodge Victory 6	NE	—	Moto-M	B&S	Cha	Wil	Moto-M	—	GR	GR	—	Cor	Ind	Cor	Ind	—	—	CG	CG	—	Lov
Dodge Std. 6	NE	—	Moto-M	B&S	Cha	Wil	Moto-M	—	GR	GR	—	Cor	Ind	Cor	Ind	—	—	CG	CG	—	Lov
Durant Four	Ste	—	Roc	—	AC	USL	—	—	—	—	VEP	Cor	—	†Kok	—	Bad	Eat	—	—
Durant 65	Ste	—	Nag	Sha	Cha	USL	Safe T	—	—	—	VEP	Cor	—	Kok	—	Bad	Bad	†Yes	Gab
Durant 75	Ste	—	Nag	Sha	Cha	USL	Safe T	—	—	—	VEP	Cor	—	—	—	†Bad	†Bad	†Yes	Lov
Durant 55	Ste	—	Roc	Sha	Cha	USL	—	—	—	—	VEP	Cor	—	—	—	Bad	Bad	—	—
Elcar 6-78	Ste	—	Ster	Sha	AC	USL	Moto-M	—	—	—	yMur	Bro	Hal	Yes	—	Ste	Ste	—	—
Elcar 878	Ste	—	Ster	Sha	AC	USL	Moto-M	—	—	—	—	Bro	Hal	Yes	—	Ste	Ste	—	—
Elcar 8-82	Ste	—	Ster	Sha	AC	USL	Moto-M	—	—	—	—	—	—	Yes	Yes	Ste	Ste	—	Lov
Elcar 8-120	Ste	Ster	Nag	Sha	AC	USL	Moto-M	Yes	—	—	—	—	—	Yes	Yes	Ste	Ste	—	Lov
Erskine Six	Ste	—	K-S	Her	Cha	Wil	—	—	—	—	Gli	Yes	Yes	—	—	Eat	Eat	—	—
Essex Super 6	Ste	—	K-S	Ele	AC	Ex	Moto-M	—	—	—	sDitz	J B	—	—	—	—	—	—	—
Falcon-Knight	Ste	—	Nag	Ele	Cha	USL	—	—	—	—	Mou	Rea	—	—	—	—	—	Buffalo	bHex
Ford A	Ste	—	Own	Ele	Cha	Own	—	—	—	—	—	Yes	—	—	—	—	—	Own	cHou
Frank'n Air. Ltd.	NE	Jag	Nag	Ele	Cha	USL	—	Cas	GR	GR	DucoVal	Bro	Bro	—	—	CG	CG	—	cWat
Gardner 130	Ste	Phi	Moto-M	D-R	Cha	Pre	Moto-M	Cun	GR	—	Ditz	Cor	Cor	—	—	Balc	Balc	—	Lov
Gardner 195	Ste	—	Moto-M	D-R	Cha	Pre	Moto-M	—	—	—	Ditz	Cor	Cor	—	—	Balc	Balc	—	Lov
Gardner 120	Ste	—	Moto-M	D-R	Cha	Pre	Moto-M	—	—	—	Ditz	Cor	—	—	—	CG	CG	—	Lov
Graham-Pg 610	NE	—	K-S	Her	Cha	Wil	Moto-M	Cun	—	—	Ditz	Cor	Cor	—	—	Ste	Ste	—	Hex
Graham-Pg 614	NE	—	K-S	Her	Cha	Wil	Moto-M	Cun	—	—	Egyp	Cor	Cor	—	—	Ste	Ste	—	Has
Graham-Pg 619	NE	†Ster	K-S	Her	Cha	Wil	Moto-M	Cun	†GR	†GR	Ditz	Cor	Cor	—	—	Ste	Ste	—	cWat
Graham-Pg 629	NE	†Ster	K-S	Her	Cha	Wil	Moto-M	Cun	†GR	†GR	Ditz	Cor	Cor	—	—	Ste	Ste	—	Wat
Graham-Pg 835	NE	†Ster	K-S	Her	Cha	Wil	Moto-M	Cun	†GR	†GR	Ditz	Cor	Cor	—	—	Ste	Ste	—	Wat
Hudson Super 6	Ste	—	K-S	Ele	AC	Ex	Moto-M	—	Yes	Cas	sDuco	J B	—	—	—	—	—	MotoW	Wat
Hupmobile A	Ste	—	Ster	Elec	Cha	Wil	Moto-M*	—	—	—	Val	Own	Hal	—	—	—	—	—	Mon
Hupmobile M	Ste	—	—	Elec	Cha	Wil	Moto-M*	—	*Yes	*Yes	Val	—	Hal	—	—	—	—	—	Mon
Jordan RE	Ste	Ster	Nag	Her	Cha	Wil	Moto-M	—	Elg	Elg	sDuc	Val	Gui	Gui	Per	—	Bif	Bif	K-H	cHou
Jordan JE	Ste	Ster	Nag	Her	Cha	Wil	Moto-M	—	Elg	Elg	sDuc	Val	Gui	Gui	—	—	Bif	Bif	K-H	cHou
Kissel 6-73	AC	Yes	Gro	Ign	AC	Wil	AC	Cas	Yes	Yes	Mim	Sto	—	—	Per	Bad	Bad	—	Lov
Kissel 8-95	AC	Yes	Gro	Ign	AC	Wil	AC	Cas	Yes	Yes	Mim	Sto	—	—	Per	Bad	Bad	—	Lov
Kissel 8-126	AC	Yes	Gro	Ign	AC	Wil	AC	Cas	Yes	Yes	Mim	Sto	—	—	Per	Bad	Bad	Day	Lov
LaSalle	AC	Jag	Nag	D-R	AC	Ex	AC	Cas	Tern	Tern	Duco	Own	Hal	Del	*Kel	USE	USE	Buffalo	cLov
Lincoln 8	Wal	Wal	K-S	Her	Cha	Ex	—	Cuno	Cun	Cas	DucoVal	Own	Own	Own	—	Bif	Bif	Own	cHou
Locomobile 8-70	Ste	Phi	Moto-M	—	Cha	USL	Moto-M	Cas	—	GR	Duco	Hal	—	—	—	Buck	—	Buffalo	cLov
Locomobile 8-80	Ste	Phi	Moto-M	Joh	Cha	USL	Moto-M	Cas	AWS	GR	Duco	Hal	—	—	—	Buck	—	Buffalo	cLov
Locomobile 90	Wal	Wal	US	Yal	Cha	USL	—	Met	GR	GR	Duco	Aga	—	—	—	Buck	—	Buffalo	cLov
Locomobile 48	Wal	Wal	Bos	Yal	Cha	Pre	—	Met	GR	GR	Duco	Aga	—	—	—	Buck	—	Buffalo	cLov
Marmon 68	Ste	—	Moto	Sha	Cha	Pre	Moto-M	—	Elg	Elg	DucoVal	Hal	Hal	Per	—	Ste	Ste	Day	Lov
Marmon 78	Ste	Borg	Moto	Sha	Cha	Pre	Moto-M	Cas	Elg	Elg	DucoVal	Hal	Hal	Per	—	Ste	Ste	Day	Lov
Marmon 75	Wal	Wal	Nas	Tra-Ign	Cha	Pre	—	Cas	AWS	AWS	DucoVal	Hal	Hal	Per	—	CG	CG	Buffalo	Lov
Moon 6-68	Ste	—	Moto-M	Joh	Cha	USL	—	—	—	—	sGli	—	—	—	—	—	—	—	aHar
Moon 6-62	Ste	—	Moto-M	Joh	Cha	USL	—	—	—	—	sGli	Ind	—	Yes	—	Yes	Yes	—	aHar
Moon 6-72	Ste	—	Moto-M	Joh	Cha	USL	Moto-M	—	—	—	sGli	Ind	—	—	—	Yes	Yes	—	aHar
Moon 8-75	Ste	Hun	Moto-M	Joh	Cha	USL	Moto-M	Yes	GR	GR	sGli	Ind	—	Yes	Hill	Yes	Yes	—	aHar
Moon 8-80	Ste	—	Moto-M	Joh	Cha	USL	Moto-M	—	—	—	sGli	Ind	—	—	—	Yes	Yes	Yes	Lov
Nash Adv. 6	Ste	†GE	K-S	B&S	AC	USL	Moto-M	†Yes	†Yes	†Yes	xDuc	Yes	Hal	—	—	Ste	Eat	Ste	—	Hou
Nash Special 6	Ste	—	K-S	B&S	AC	USL	Moto-M	—	GR	GR	xDuc	Yes	Hal	—	—	Bif	Bif	Bif	—	Lov
Nash Stand. 6	AC	—	K-S	B&S	AC	USL	Moto-M	—	—	—	xDuc	Yes	Bro	—	—	Bif	Bif	Bif	—	Lov

Haskell Discusses Relation Of Time-Study to Industry

"Relation of Time Study to Manufacturing" was the subject of the paper presented at the S. A. E. production meeting in Detroit Friday by L. W. Haskell of Dodge Brothers, Inc. He said, in part:—

"The relation of time study to industry is a field which research has not fully explored.

"The skill and thoroughness of the work of the time-study man are becoming more important to management, as time study is now used as the basic unit of measurement for items such as machine loads, labor control, cost estimates, budgets, wage incentives and many others.

"Although time study is an important element in the development of management in industry, it is not a panacea for all industrial ills, nor is it necessarily an economic arm, as profits may or may not be made without it; but, because of its fairness to all concerned, it should not be overlooked. It is essentially constructive in its functions, as it has for its ultimate objective the arriving at a standard time in which the work can be done. This standard is reached only after each act and mechanism necessary to the completion of the work has been carefully analyzed, the conditions improved, all unnecessary work eliminated and all acts essential to the job simplified as much as possible, giving skill, effort, fatigue and unavoidable delays their due consideration.

"Its success as a basis for a wage incentive lies not on the assumption that men must work harder, but, rather, in the fact that it induces them to work better, with less waste of motion and time, thereby reducing labor costs through a higher and more uniform rate of production. It reduces idle time of men and machinery by determining the proper operating force for a given schedule and prevents the purchase of new equipment so long as machine hours sufficient to meet the schedule are available. It provides the accounting department with an accurate labor cost per unit of production, maintains and assures a higher quality of product by aiding in the adoption of better methods and improves labor conditions by releasing surplus men for other lines of endeavor, thereby assuring the employee a fair day's pay for a fair day's work.

"To to employer and to the country, it is equally essential that industry be conducted with the greatest efficiency, so that the cost of the finished product shall be at the minimum.

"It is obvious, then, that a wage incentive plan that is of maximum benefit to employee and employer alike is conducive to good business."

UPWARD SWING SEEN IN GERMAN CAR OUTPUT

Washington, Nov. 24.—German automobile production, a considerable portion of which has its seat in the Stuttgart district, has had an upward swing throughout 1928, according to a report of the Automotive Division of the United States Department of Commerce.

The number of passenger cars during the first eight months of the year increased 36 per cent., and sales 39 per cent. over the corresponding period of 1927. Medium-size cars were less in demand than were the eight-cylinder and small vehicles. Sales of the former increased 70 per cent., the latter 45 per cent. Sales of trucks have increased 45 per cent. Dealers reported even better trade in September than in July and August. Establishment of appraising offices to fix values of used cars has occurred in additional cities, aiding in the solution of the used-car problem.

Woodbury Discusses Chain Drive, Selection Application

Chain drives, their construction, selection and application for industrial purposes, were discussed in a paper presented at the Power Transmission Session of the S. A. E. production meeting in Detroit Friday by A. C. Woodbury of the Society of Automotive Engineers. Mr. Woodbury's paper was in part as follows:—

"The silent chain drive has been found to fill a great need in power transmission, because it furnishes a positive drive that is much more compact than a belt drive and much more flexible than a gear drive. The compactness makes it available in individual drives from motors to machine tools with little or no additional floor space required for the motor. Often motors can be mounted directly on the tool, to make a self-contained unit that can be moved about and placed as required for convenience in manufacturing, without reference to anything like a line shaft.

"Silent chain joints can be divided into two classes, according to whether they have sliding action, like a plain journal bearing, or contain two members that rock on each other.

"In its original form the silent chain was made up of links of the same general outline as now, with round pinholes, and the joints were completed with plain round pins.

"As alternate links or groups of links pull in opposite directions on the pin, the projected area of the bearing is only one-half of the product of the diameter times the bearing length of the pin. It is true that the pin is free to rotate and distribute the wear over its whole surface, but the pressure is distributed over one-half the surface. The punched holes in the links, too, are not so smooth as high-grade bearings, and generally tend to be tapered by an amount approximately equal to the clearance between the punch and the die.

"Bushings of various kinds have been designed to improve the wearing surface in the links. In some English chains short, round, hardened bushings are pressed into the links in pairs; in others, short segment bushings are used in the same way. These provide better bearing surfaces, but the pins cannot be made so large.

"The well-known Link-Belt silent chain also is made with bushings of a segment section, but each extends the full width of the chain, with clearance notches cut in alternate links or groups of links to allow the joint to articulate. This construction provides a continuous bearing approximately equal in length to the width of the chain, but covering only about ninety degrees of the circumference of the pin. The net result in bearing area is not much different from that in the first-mentioned design, but good bearing surfaces are provided and the articulation of the joint is favorable to lubrication.

"Another development of the plain bushed bearing is found in the Whitney chain. This is made up of sub-assemblies or units, consisting of two "tight-hole" links in one pitch and two "loose-hole" links in the next pitch, with round bushings or sleeves pressed into the tight holes to make a complete chain. Except that the bushing cannot float, this unit is the equivalent of a narrow chain like that

"The Morse Chain Company, maker of rocking joint silent chains, has made for use in automobiles a large number of chains of small pitch with the sliding type of joint. This joint might be described as being made up of one segmental bushing, similar to the second type described, and a pin fast in the outside link, with the central links in one pitch fitting on the bushing and those in the next pitch fitting on the pin. This joint is said to wear better in the smaller pitches than the rocker joint, at least when lubricated, as it is in the front-end drive of an engine, but it has been used very little in industrial drives.

"Another joint of the sliding type that has been developed by the Morse Chain Company is being introduced in motor car front-end-drive chains. It comprises two segmental bushings and a central pintle that is not round, but lunar in section, having two sides that are circular arcs, like the section of a double convex lens. This shape makes possible greater bearing surfaces than most of the others.

Another rocking joint chain is made by the Ramsey Chain Company. The essential difference is that the Morse joint has a flat seat pin and a rocker pin with curvature that is not uniform, while the Ramsey chain has two identical pins with convex working surfaces that are circular arcs.

"With any joint of this type there is a certain amount of shifting of the center of action, so that the joint does not bend in exactly the same way as does a joint consisting of a cylindrical pin and bushing. Also, a clearance must be allowed in the opening between the back of each pin and the link to permit the motion. If there is no clearance, the joint cannot move, and if there is not enough clearance a sliding action between the two pins will be introduced.

ACTION OF CHAIN ON SPROCKET

"When a chain of any type is wrapped around a sprocket, its individual links may be considered as forming the sides of a polygon hav-

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Passenger Car Equipment and Accessories

Name and Model	Shock Absorber	Wire Wheels*	Rear Bumper	Front Bumper	Heater	Windshield Wings	Parking Light	Stop Light	Make of Body Finish Used	Vanity Set	Smoking Set	Cig. Lighter	Heat Indicator	Battery	Spark Plugs	Lock	Fuel Gauge	Clock	Speedometer	
Oakland All-Am	A C	—	K-S	D-R	A C	Wil	—	—	†Fis	†Fis	Duco	D-R	Ind	—	—	CG	CG	Mot W	cLov
†Oldsmobile	A C	—	K-S	D-R	A C	Wil	A C	—	Tern	—	§Duco	D-R	D-R	—	—	Own	Own	M W	cLov
Packard 626, 633	N E	Jag	K-S	—	Cha	Pre	Moto-M	Cas	Own	Cas	sVal	Own	Own	Yes	Kel	Cen	Cas	—	Own
Packard 640, 645	N E	Jag	K-S	—	Cha	Pre	Moto-M	Cas	Own	Cas	sVal	Own	Own	Yes	Kel	Cen	Cas	—	Own
Peerless 91	A C	Elg	Moto-M	Ele	Cha	Ex	Moto-M	—	G R	G R	Val	Gui	Gui	Kok	—	Bif	—	—	Lov
Peerless 81.....	A C	Elg	Moto-M	Ele	Cha	U S L	Moto-M	—	G R	G R	Val	Cor	Cor	Kok	—	Bif	—	—	Gab
Pierce-Arrow 36	Wal	Wal	Roc	Her	Cha	Wil	Moto-M	Cas	†AWS	†AWS	sDuco	Aga	Aga	—	—	Own	—	Buffalo	cHou
Pierce-Arrow 81	Wal	Wal	Roc	Her	Cha	Wil	Moto-M	Cas	†AWS	†AWS	sDuco	Aga	Aga	—	—	Own	—	Buffalo	cHou
Plymouth	N E	—	Roc	Sha	A C	Wil	—	—	—	—	Duco	Cor	—	—	—	—	—	—	—
Pontiac 6-28 ...	A C	—	K-S	D-R	A C	Pre	—	—	†Fis	†Fis	Duco	D-R	D-R	—	—	CG	CG	Buffalo	cLov
Reo Wolverine ..	Ste	—	Moto-M	Ele	Cha	Wil	—	—	Elg	Elg	sDitz	Gui	Gui	—	—	CG	CG	—	a†Lov
Reo Flying Cl'd	Ste	—	K-S	Blos	Cha	Wil	A C	—	G R	G R	sDitz	Gui	Gui	—	—	CG	CG	—	cLov
Ste'rns-K.H. 8-90	Ste	Wal	Nag	Ele	Cha	U S L	—	Cuno	†Elg	†Elg	sVal	Hal	Gui	†Yes	—	Bif	Eat	Bif	Buffalo	cHou
Stearns-K.J 8-90	Ste	Wal	Nag	Ele	Cha	U S L	—	Cuno	†Elg	†Elg	sVal	Hal	Gui	†Yes	—	Ste	Ste	Buffalo	cHou
Studebak. Dict..	Ste	—	K-S	Her	Cha	Wil	Yes	—	—	—	Gli	Yes	Yes	—	—	Eat	Eat	—	cMon
Studebaker Com	Ste	—	K-S	Her	Cha	Wil	Yes	*Yes	—	—	Gli	Yes	Yes	—	—	Eat	Eat	—	cMon
Studebaker Pres	Ste	Yes	Nag	Her	Cha	Wil	Yes	Yes	Yes	Yes	Gli	Yes	Yes	—	—	Eat	Eat	—	cMon
Stutz BB	A C	N H	Gro	Mil	Cha	Pre	A C	Cas	Elg	Elg	Val	Bro	—	Kok	—	Buck	Buck	Buffalo	cLov
Velie 68	Ste	—	Nag	Ele	Cha	Pre	Moto-M	—	—	—	Duco	Vict	—	—	—	CG	CG	Buffalo	Lov
Velie 78	Ste	—	Nag	Ele	Cha	Pre	—	—	GR	—	Duco	Vict	—	—	—	CG	CG	Buffalo	Lov
Velie 90	Ste	—	Nag	Ele	Cha	Pre	—	—	GR	—	Duco	Vict	—	—	—	CG	CG	Buffalo	Lov
Whippet Four..	Ste	—	Roc	Ele	Cha	U S L	—	—	—	—	Mou	Ind	—	—	—	—	—	Buffalo	aGab
Whip. 6, Mod 98	Ste	—	Roc	—	Cha	U S L	—	—	—	—	Mou	Ind	—	—	—	—	—	Buffalo	aGab
Willys-K. Sta. 6	Ste	—	Nag	—	Cha	U S L	—	—	—	—	Mou	Ind	Yes	—	—	—	—	Buffalo	cGab
Willys-K. Spl. 6	Ste	—	K-S	Ele	Cha	U S L	Moto-M	—	G R	G R	Mou	Ind	Yes	—	—	—	—	—	cGab
Willys-K. Grt. 6	Ste	—	Nag	Ele	Cha	U S L	Moto-M	—	G R	G R	Mou	Ind	Yes	—	—	—	—	†† Buf	cBosch

KEY TO ABBREVIATIONS USED IN THIS TABLE

GENERAL

*In addition to its regular line Oldsmobile also offers a de luxe line. De luxe equipment includes: Six wire wheels (with six tires and tubes), two wheels carried in front fender wells and securely locked in position, chromium-plated headlamps, four spring boots, folding trunk rack at rear and sheet metal (fenders, etc.) ducoed in color on those models on which ducoed sheet metal is more harmonious than is black enameled sheet metal.
*Moto Meter equipment supplied by the factory at dealer's option.
Z—Optional. †On some types.

SPEEDOMETER

AC—AC Spark Plug Co., Flint, Mich.
NE—North East Electric Co., Rochester.
Ste—Stewart-Warner Speedometer Corp., Chicago.
Wal—Waltham Watch Co., Waltham, Mass.

CLOCK

Chel—Chelsea Clock Co., Boston, Mass.
El or Elg—Elgin Clock Co., Elgin, Ill.
GE—General Electric Co., Schenectady.
Hun—Hunter; see Elg.
Jag—Jaeger Watch Co., New York city.
NH—New Haven. See Phi.
Phi—Phinney-Walker Co., New York city.
Ster—Sterling Electric Clock Corp., New York city.
Wl or Wal—Waltham Watch Co., Waltham, Mass.

FUEL GAUGE

Bos—Boston Auto Gage Co., Pittsfield, Mass.
Gro—Grolan Co., Dayton, O.
KS—King-Seeley Corp., Ann Arbor, Mich.
Nag—Safe-T-Stat Co., Brooklyn, N. Y., and Toledo, O.
Moto-M—Moto Meter Co., Inc., L. I. City, N. Y., and La Crosse, Wis.
Roc—Rochester Mfg. Co., Rochester, N. Y.
Ster—Sterling Electric Clock Corp., New York city.
US—U. S. Gauge Co., New York city.

LOCK

B&S—Briggs-Stratton Co., Milwaukee.
Blos—Blossom.
Clum—Clum Mfg. Co., Milwaukee, Wis.
Corb—Corbin Cabinet Lock Co., New [illegible] Co., Holmesburg,
Elec—Electro Lock.
D-R—Delco-Remy Corp., Anderson, Ind.
Her—Hershey Mfg. Co., Chicago.
Ign—Ignition.
Sar—Sargent & Co., New Haven, Conn.
Joh—Johnson Automobile Lock Co., St. Louis, Mo.
Mil—Miller Lock Co., Philadelphia.
N. E.—North East Electric.
Sha—Shaler Lock Co., Milwaukee, Wis.
Tra—Transmission.
War—Warner Gear Co., Muncie, Ind.
Yal—Yale & Towne Mfg. Co., Stamford, Conn.
*Coincidental St. Gear & Ign.

SPARK PLUGS

AC—AC Spark Plug Co., Flint, Mich.
Cha—Champion Spark Plug Co., Toledo, O.

BATTERY

Ex—Electric Storage Battery Co., Philadelphia.
Pre—Prest-O-Lite Co., Indianapolis, Ind.
USL—U. S. L. Battery Corp., Niagara Falls, N. Y.
West—Westinghouse.
Wil—Willard Storage Battery Co., Cleveland, O.

HEAT INDICATOR

AC—AC Spark Plug Co., Flint, Mich.
Moto-M—Moto Meter Co., Inc., Long Island City, N. Y., and La Crosse, Wis.
SafeT—Safe-T-Stat Co., Brooklyn, N. Y.

CIGAR LIGHTER

Cas—Connecticut Automotive Specialty Co., Bridgeport, Conn.
Cun—Cuno Engineering Corp., Meriden, Conn.
GRGR—Grand Rapids Metalcraft Corp., Grand Rapids, Mich.
Met—Metal Specialties Mfg. Co., Chicago.
†On some models.
*Closed models only.

SMOKING AND VANITY SETS

AWS—Art Metal Works, Newark, N. J.
Cas—Connecticut Automotive Specialty Co., Bridgeport, Conn.
Cun—Cuno Engineering Corp., Meriden, Conn.
El or Elg—Elgin Clock Co., Elgin, Ill.
Fis—Fisher Body Corp., Detroit.
GR—Grand Rapids Metalcraft Corp., Grand Rapids, Mich.
*On Studebaker line, ash receiver only.
Tern—Ternstedt.

BODY FINISH

Arco—John L. Armitage & Co., Newark, N. J.
Ditz—Ditzler Color Co., Detroit, Mich.
Duco—E. I. du Pont de Nemours & Co., Philadelphia.
Egypt—Egyptian Lacquer Co.
Gil—Gidden Co., Cleveland, O.
Mim—Mimax, Pittsburgh Plate Glass Co.
Mou—Mountain Varnish & Color Works, Toledo, O.
Mur—Murphy Varnish Co., Newark, N. J.
Shw—Sherwin-Williams Co., Cleveland, O.
Val—Valentine & Co., New York city.
VEP—V. E. P. Co., St. Louis, Mo.
§—Also Rinshed-Mason.
v—Also Ditz.
x—Also other makes.
Var's—Various.
x—Also Pittsburgh Plate Glass Co., Milwaukee, Wis.
y—Also Wilhelm Co., Reading, Pa.

STOP AND PARKING LIGHTS

Aga—Federal Pressed Steel Co., Chicago.
Bro—Brown & Green Ignition Sales Co., New York city.
Cor—Corcoran Co., Cincinnati, O.
D-R—Delco-Remy Corp., Anderson, Ind.
Gui—Guide Motor Lamp Mfg. Co., Cleveland, O.
Hal—Hall Lamp Co., Cincinnati, O.
Ind—Indiana Lamp Corp., Connersville, Ind.
Rea—Appleton Electric Co., Chicago.
Sto—Stover Signal Engineering Co., Racine, Wis.
Viet—Cincinnati Victor Co.
JB—John Brown Lamp Co.

WINDSHIELD WINGS

Ben—Benzer Corp., Brooklyn, N. Y.
JH—Tonneau Shield Co., Inc., New York city.
John—Johnston Mfg. Co., Chicago.
Kok—Fulton Co., Milwaukee, Wis.
Per—Perfection Heater & Mfg. Co., Cleveland, O.
Del—Delco-Remy.

WIRE WHEELS

Moto W—Motor Wheel Corporation.
Day—Dayton Steel.
K-H—Kelsey-Hayes.
M W—Motor Wheel Corp.
*Buffalo—Wire Wheel Corporation of America, Buffalo, N. Y.
†On Durant lines Model 65s and 75 on cabriolet, roadsters and broughams.
††On Willys-Knight Foursome model only.
§De luxe equipment on 5 body types announced Aug. 1.

HEATER

Gla—Gladiator Mfg. Co.
Hil—Hill Products Corp., Chicago.
Kel—Kelch; made by Roberts Brass Mfg. Co., Detroit, Mich.
Per—Eaton Axle & Spring Co., Cleveland, O.
Rov—Rovey Auto Heater Co., Chicago.
*Special equipment.

BUMPERS

Al—Alloy Steel Spring & Axle Co., Jackson, Mich.
Bad—Badger Mfg. Corp., Milwaukee.
Bale—Cincinnati Ball Crank Co., Cincinnati, O.
Ball—Automobile Equipment Mfg. Co., Chicago.
Bif—Biflex Corp., Waukegan, Wis.
Buck—See Cen.
Cen—Central Brass & Fixture Co., Springfield, O.
CG—CG Spring & Bumper Co., Detroit.
Eat—Eaton Axle & Spring Co., Cleveland.
Fed—Federal Pressed Steel Co., Chicago.
Ster—Sterling Spring Co., Cleveland, O.
Ste—Stewart-Warner Speedometer Corp., Chicago, Ill.
USE—U. S. E. Corp., Long Island City.

SHOCK ABSORBER

Bosch—American Bosch Magneto Corp., Springfield, Mass.
Gb or Gab—Gabriel Snubber Mfg. Co., Cleveland, O.
Har—Edward V. Hartford, Inc., Jersey City, N. J.
Has—Robert H. Hassler, Inc., Indianapolis, Ind.
Hx or Hex—Detroit Steel Products Co., Detroit, Mich.
H. or Hou—Houde Engineering Corp., Buffalo, N. Y.
Lov—Delco-Remy Corp., Anderson, Ind.
Mon—Monroe.
Wah—Wahl Co., Chicago.
Wat—John Warren Watson Co., Philadelphia.
Wec—American Chain Co., Bridgeport, Ct.
a—Front only.
b—Rear only.
c—Front and rear.
**Front. Lov. rear.

RADIATOR SHUTTERS

Oldsmobile own.

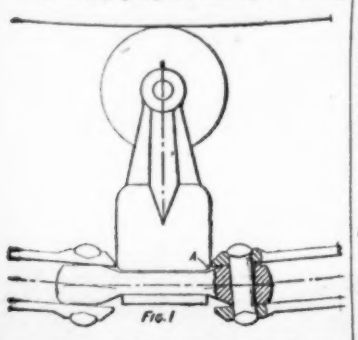
Detroit Papers Cover New and Proven Methods

Conveyor-Chain Curvature Is Discussed by J. B. Webb

Factors affecting the amount of deflection, such as the construction of the chain, the amount of load and the trolley spacing were discussed by J. B. Webb of the J. B. Webb Company at the material-handling session of the S. A. E. in Detroit. His subject, "Possibilities and Limitations of Conveyor-Chain Curvature," is in part as follows:—

"In this discussion of the curvature of chains, I am necessarily considering it in its connection with the continuous power-driven overhead trolley and chain conveyor systems. In conveyors of this type, the chain is suspended on edge from a track by trolleys, connected to the chain or forming a part of the chain, on reasonable centers. The chain is deflected or curved upward and downward by such trolleys on a track bent in a vertical plane. It is this up-and-down or transverse curvature that is treated of in this paper.

"It is my purpose merely to bring



out some of the many considerations that enter, so that it may be more readily appreciated why no definite rules can be set down; also to indicate a method of attacking an individual problem.

"To better approach this discussion, I have divided it into three parts:—

"1. The stresses we have to contend with in a chain when it is flexed in a plane at right angles to its normal turning angle.

2. "A discussion of the elements limiting the radius of such flexing.

3. "What has been done and what may be possible.

How Various Chains Deflect

"Figures 1, 2 and 3 illustrate three fairly well-known types of overhead systems. Each has a different method of accomplishing the result, and each introduces a bending-moment or unbalanced stress in the chain, thereby reducing its effective ultimate strength. No chain that is deflected in a transverse direction while under stress will show the same strength that it would if pulled in a straight line.

"Figure 1 shows the construction of Keystone chain, which has become very popular as a conveyor of this class. The center link is open, so the pin fits in a semi-cylindrical bearing and can leave its seat, as shown, if the chain is deflected transversely.

"In this chain, or in any other chain used as an overhead conveyor, the horizontal and vertical bends are kept separate. Therefore, the pin does not turn in its bearing when the chain is deflected transversely, and the bearing surfaces do not suffer from this action. It is apparent that the pin is in single shear when the chain is deflected. The side links are not subjected to bending stress if the amount of deflection is reasonable, although the center link may be subjected to a bending moment on a lever arm of length equal to the distances from the center of the pin to the point of support in the trolley fitting, A in Fig. 1. Although this leverage is short, it introduces a certain transverse stress in the chain.

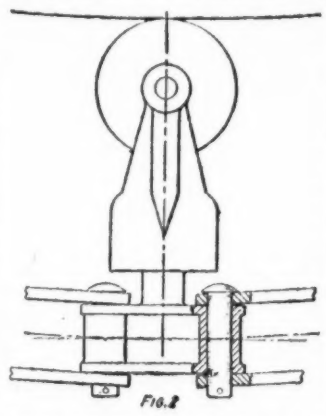
"The type of chain shown in Fig. 2 is known as the combination chain, being made up of malleable iron center links with steel side links and pins. When deflected transversely, most of the deflection takes place in the side plates, because of the clearance under the heads of the pins and in the holes in the plates. The permissible deflection in a chain of this type is much less than in the two other types shown; therefore, the radius of curature must be greater. If too sharp a curvature is attempted, the link at the inner side becomes a compression member and that at the outer side a tension member, introducing a very severe bending moment. The load on the pin at the inner side of the chain is negative, and the load on the outer side is equal to the total net pull on the chain plus the negative load on the inner side. If deflected too sharply, there is also a tendency to shear the cotter pin. A chain of this type gives very satisfactory results if it is not used on vertical curves of too short radius.

a transverse joint is provided on the trolley link. This seems to permit a greater deflection of the chain, but analysis shows that it also has its limitations. In spite of this flexible joint, bending introduces a bending moment which, in my opinion, may be as great as the bending moment or transverse stress in other chains. During the upward bend the trolley wheel has a tendency to collapse, which is resisted by the vertical pin B. The trolley arm is always at right angles to the section of chain to which it is rigidly fastened, but on a vertical curve it is at an oblique angle to the section of the chain beyond the horizontal pin A.

"There is a tendency for the wheel to rotate about the pin center A, in Fig. 3, in a counter-clockwise direction during an upward bend of the chain. In resisting this at the pin B the upper part of the chain link is placed in tension and the lower part in compression, with the result that the upper part of the link is called upon to carry a very severe load if the deflection is great. It also results in shearing stress in a negative direction at the one end and a shearing stress greater than the total net pull of the chain at the other end of the pin B.

ALLOWABLE RADIUS OF CURVATURE

"In the light of the description given, it is obvious that the load or stress on the chain is an important consideration. Liberties can be taken with chain curvature in a conveyor that does not require much



pull on the chain; but short radii of vertical curvature should be avoided on long or heavily loaded conveyors.

"Another important consideration is the trolley spacing, which affects the radius of curvature in several ways. To visualize this influence, let us imagine a square inscribed within a circle. The circle represents the track, the corners of the square represent the trolleys, and the sides of the square represent the chain. It is easy to see that a considerable deflection must be made at the trolley, that the chain is heavily stressed and that the trolley is carrying a load proportionate to a diagonal of the square instead of one of its sides. The load on the trolleys would be the same as on a sprocket carrying a 90-degree deflection at any point of the conveyor system. If trolleys were built for such a condition, the cost of overhead conveyors would be prohibitive and the bending moment on the joints would be excessive.

"For comparison let us visualize another circle with a many-sided polygon inscribed. As before, the circle is the track, trolleys are the corners and the chain is the sides. Immediately we see that the resultant force on the trolley is much less and the bending moment in the chain much smaller.

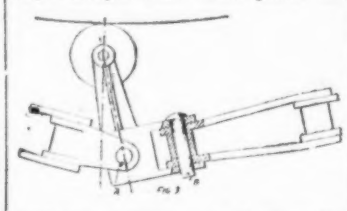
"The popular idea seems to be that the required capacity of a trolley is determined by the load to be suspended from it. The greatest stress on any conveyor having vertical dips is not caused by the load carried, but is the resultant of the chain pull at right angles to the chain at the point where the trolley comes when the trolley is deflecting the chain upward or downward. This resultant is greatest at a point nearest to that at which the drive is applied to the chain.

EFFECT OF TROLLEY SPACING

"In overhead conveyors there is not actually a radius of curvature in the chain, but angular deflection at each trolley and a straight line between trolleys. The closer together the trolleys are the less is the angle of deflection necessary for a given curve; therefore, the closer together the trolleys are the smaller is the radius of track curvature that can be tolerated.

"Next to the load factor I believe that trolley spacing is a most important consideration in small radii of curvature, regardless of how great deflection is possible in the chain.

"Finally, in regard to the allowable radius, its position relative to the conveyor drive is of prime im-



portance. Curves of short radius should be avoided where the greatest chain tension is found; that is, close to the pulling side of the drive. If short-radius curves must be used, they should be placed where they will be fed from the slack side of the drive.

"Overhead conveyor systems having a radius of vertical curvature at the I-beam track as small as 24 inches are in operation. This is with 12-inch trolley spacing, and the conveyor is not heavily loaded. There are several examples of I-beam curvature of 4½ to 5 feet radius, with 16-inch trolley spacing. These conveyors also are not heavily loaded, the load not exceeding 50 pounds per trolley, and the lengths are about 400 to 500 feet.

"Properly installed overhead conveyors should not have more than 3 per cent. friction. It is for this reason that overhead conveyors, sometimes a mile in length and having many vertical dips, are possible. With such long conveyors, the pull may be about 2,000 pounds. The curvature radii must be kept large and careful attention must be given to the trolley spacing.

"In closing, I wish to advise earnestly that any one having conveyor problems that require any unusual deflection of the chain, under more than very light stress, should consult with some conveyor manufacturing organization which has had much conveyor experience."

STUDY FUNCTIONS OF PRODUCTION EXECUTIVE

New York, Nov. 24.—"The position of the production executive in the business organization has developed directly as the complexity and volume of manufacturing have developed," according to the twelfth Business Organization leaflet just issued by the policy holders service bureau of the Metropolitan Life Insurance Company.

The report goes on to point out that it has been a comparatively short time since production responsibilities were concerned simply with the physical operations involved in the fabrication of products and were invested in an individual who needed to be little more than a foreman. It then presents in detail a careful first-hand study of the position of the production executive in a number of typical business organizations of today, among them the Nash Motors Company.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRINGS RESULTS

Woodbury Discusses Chain Drive, Selection Application

(Continued from Page 9)

ing as many sides as there are teeth in the sprocket, the joints of the chain being the angles of the polygon. As the sprocket rotates, the action is not smooth, like that of a belt on a pulley; the chain rises and falls between limits measured by the difference between the radii of the inscribed and circumscribed circles of the polygon. The rise and fall is less as the number of teeth of the sprocket is made larger.

"It is also evident that, with a uniform speed of the sprocket, the horizontal component of the speed of the chain is greater when the joint is at the highest point than at the instant one link is making contact with the sprocket. This is true of a chain and sprocket of any type and is one of the reasons why chains of short pitch are quieter and smoother in action than chains of long pitch when running at the same speed.

VIBRATION ABSORBED BY ELASTICITY

"As we pass to the consideration of higher speed drives, we find that there is a speed at and above which the vibration imparted to it by the polygonal nature of the sprocket is so rapid that the chain will not respond throughout its full length, because of inertia. The result is a slight wave motion of the chain and the variation in lengthwise speed must be absorbed by the elasticity of the elements of the chain and of the oil films in the joints. These irregularities provide many of the problems of the chain engineer. If they could be eliminated chains no doubt would be more durable and more quiet.

Silent Chain Sprocket Contact

"Most silent chains make contact with the sprocket only at the outer faces of the links. The included angle of the link, ordinarily sixty degrees, determines the shape of the sprocket teeth, which have straight working faces, with the inner faces of two alternate teeth having also an including angle of sixty degrees. The result is that the angle between opposite sides of a single tooth varies, according to the number of teeth. The sides of the limiting twelve tooth sprocket are parallel, and the angle increases as the number of teeth is increased. Incidentally, a sprocket with so few as twelve teeth is virtually never used with a silent chain.

"It is best wherever possible to use an odd number of teeth in the smaller silent chain sprockets, because each pitch of chain makes contact with only one-half of the face of the sprocket, and the next pitch makes contact with the other half.

GUIDES FOR SILENT CHAINS

"In most chain drives the guiding means are applied to the chain rather than to the sprocket, in the form of either center guides or side guides. With extra-wide chains two or more guides are employed, distributed through the width of the chain. Guide grooves in driver sprockets should be made wider than those in driven sprockets, to assure guiding by the slack side of the chain.

"It seems entirely possible that standardization of chains could be effected on the basis of the largest tangency circle in each pitch. If all new sprockets were made on this basis a chain of any make would operate on them, and no chain maker would be obliged to make immediate changes in his chains to make them interchangeable on standard sprockets.

"A limited study of this sort would be worth the while of any large user of chains who is interested in interchangeability for his own service.

GREAT ACCURACY REQUIRED

"Since a silent chain is made up of many small parts, it is easy to see that summation of minute inaccuracies in each part may amount to an excessive variation in the pitch of the chain. With 24 pitches per foot, a variation of 0.0001 in. in each joint of a ½-in. pitch chain will make a difference of about $\frac{3}{16}$ in. in the length of a chain for an ordinary drive on 3-ft. centers, and might make a chain 0.100 in. too short to wrap around a 100-tooth sprocket. Those types of joint which require several parts, the inaccuracies of which may be added to one another, are at a disadvantage in this respect. In some cases the total variation in each part cannot exceed 0.0025 in. without causing a possible variation of more than 0.001 in. in the pitch. As links are produced by stamping, and pins of irregular shapes by cold drawing, the difficulty of holding the required degree of accuracy is evident.

"Sprockets often are cut to a tooth depth that is determined solely by wrapping a piece of chain of the required pitch around the sprocket. A much more accurate way of measuring is by laying two round pins in the opposite tooth spaces and measuring over them with a micrometer or a nernier calliper.

Selection of Type of Chain

"Obviously, any one who is not in the employment of a chain company cannot recommend one type of chain to the exclusion of all others.

"The sliding type of joint seems to be more advantageous for use where the lubrication will be ample. No chain should be operated without lubrication, but many drives have given satisfaction under conditions of lubrication that are far from ideal.

"With exceptionally high chain-speed, especially if the chain length is short and the sprockets are small, friction in the joints of the chain can produce an appreciable amount of heat. The rocking type of joint undoubtedly has less friction, and its use can be extended a little further in extreme cases.

WEAR TEST HELPS IN SELECTION

"Consideration should be given also to the accuracy of the chains as manufactured, and to the durability as determined either by wear tests or by a comparison of the joint construction. In selecting a chain for equipment on a quantity of machines, it is practicable to conduct wear tests either on the actual machines or on a simple testing apparatus in which several chains may be driven in tandem over small sprockets of equal size, the power being transmitted from a motor through the several drives under test to a fan brake, a generator or to some useful load. The various chains should be removed at regular intervals during the test and measured by connecting them over two sprockets that are kept for the purpose, the amount of wear being determined by the increase in center distance between sprockets.

"One important consideration in regard to chain wear that is not readily apparent is that some chain joints wear at points other than those at which the articulation is planned. Bushings and pins that are not pressed into place, so that there can be no relative motion between the joint member and the link, often wear so much that the total elongation in the joint is greater at these points than at the points where the sliding or rocking is designed to occur. In such cases wear probably is greater in the hold in the link than it is on the back of the bushing or pin, since the link is not hardened. Undoubtedly the impact between chain teeth and sprockets and the vibration of the chain due to the polygonal nature of the sprocket are the chief causes of this wear. Another cause in some chains may be that, as the chain leaves the sprocket and becomes straight, the construction of the joint prevents it from bending backward. In acting thus as a stop to the motion, the pins of the joint tend to move in the link.

"For the ordinary run of industrial drives, the selection of pitch and width of chain can be made with almost identical results either by the sales engineer of any one of the leading chain companies or by a production engineer who will follow carefully instructions given in the various chain catalogues.

Automobile Dealers Look For Good Business in 1929

(Continued from Page 1)

has continued to respond to the stimulus of low prices offered and the establishment of terms of payment that make it cheaper to own a used car than to be without one. Sales of used cars are held partially responsible for the traffic conditions, which are more congested than ever.

Before the advertised time of opening the first public showing of the new Chevrolet six line in the General Motors Building this morning, there were crowds to see the cars. In the main lobby, the throng congregated around the new car, and the auditorium was packed from the opening to the closing hour. By noon the showing in the retail store, also on the ground floor, had attracted its quota.

Talk about the show of the Detroit Automobile Dealers' Association, though it is not to be held until January 19, is already in the air. The committee in charge of the details is headed by J. A. Schulte (Cadillac-La Salle). Working with him are John W. Neumann (Pierce-Arrow), W. J. Bemb (Buick), L. F. Mullin (Reo and Stutz) and W. J. Judd (Nash). They promise that even the beauty of last year's show, which set a high mark, will be surpassed by this year's exhibit.

A new feature of the show will be the custom body salon, at which about ten important makers of fine automobile bodies will be represented. The salon is to be held in a separate room and admission to it will be by invitation only. A large number of invitations has been issued, however.

The new Chevrolet was shown for the first time to the company's zone managers when they gathered in Detroit the first of the week, and it created a sensation. The zone men are full of enthusiasm for the line and promise that their sales efforts in merchandising it will make new Chevrolet sales history.

First public showing of the line opened here this morning, in the auditorium of the General Motors Building, Detroit, sharing with New York the date on which the cars were first seen by any one, but newspapermen and Chevrolet executives. The program for launching the 1929 line in the markets of the world has already surpassed any previous big-time undertaking in the automotive field. Tons of literature have been mailed out of Detroit, describing and illustrating the cars.

Lighted "shadow boxes," with full-color illustrations of the various models, and slide films for projection are being utilized to spread the Chevrolet gospel. Special talking records, so timed as to synchronize with the illustrations, are used, and the sales division is taking every means to get all the facts before its dealers and salesmen in advance of the time when they will actually have cars to sell. The matter of progressive delivery to distributors is going forward with carefully regulated plans.

A series of eleven advance showings has been started with the simultaneous exhibits in Detroit and New York. These will cover the country and will continue until December 22, by which time it is estimated that more than a million people will have attended these miniature, but complete, automobile shows. This attendance will include 30,000 Chevrolet dealers and salesmen, some of whom will travel 300 miles or more to be present at the exhibits.

From Detroit, the exhibit will be taken to Chicago for showing December 1 to 6.

Detroit was also the scene this week of the production meetings of the Society of Automotive Engineers, among the largest that have ever been held by that body. Details of the programs and discussions of the papers are given elsewhere in Automotive Daily News. The gathering was not only large and enthusiastic, but it was full of gossip and talk about the 1929 season and the general future of the industry. There was pretty unanimous expression of the notion that the coming year would set new standards not only in design and mechanical excellence but in volume of production and sales. Counted attendance ran well over 750, a very large number for such a convention of the engineers.

Expansion of operations by the Universal Credit Company, handling time payment sales of all Ford products and making its headquarters in Detroit, has been made at an extremely rapid rate, the officials report. The organization, which is wholly controlled and financed by the Ford interests, is giving the Ford dealer important aid, and it is estimated that between 50 per cent. and 70 per cent. of all sales of the Model A cars and Model AA trucks are being sold on the basis for which the credit company is sponsor.

Business in excess of $10,000,000 has already been written at branches in New York, Detroit, Chicago, Atlanta, Boston, Kansas City, Buffalo, Philadelphia, Washington, Jacksonville and Dallas. Plans have been explained to more than 3,600 dealers who operate in territory served by these present branches and extension to the whole dealer body, totaling something like 8,000, is among the company's immediate plans. Eventually, there will be thirty-five branches, located at key points in the United States.

Ernest Kanzler, who heads the company, was formerly a Ford vice-president, and B. J. Craig, secretary and treasurer, is the secretary and the assistant treasurer of the Ford Motor Company.

MURRAY OHIO CO. SELLS BONDS FOR EXPANSION

Cleveland, Nov. 24.—Otis & Co. and the Tillotson & Wolcott Company are offering $1,000,000 ten-year 6½ per cent. sinking fund debentures of the Murray Ohio Company at $100. The debentures, in $1,000 denominations, carry warrants giving the holder the right to subscribe to ten shares of common stock at $50 a share at any time up to December 1, 1933. Debentures in denomination of $500 will carry warrants for five shares.

The company is building a complete new unit at the Mason City, Mich., plant, and, as business is steadily expanding, considerable cash is required for working capital. Financing is to retire the 8 per cent. preferred stock, bank loans, etc.

AMERICAN-LA FRANCE EXECUTIVES IN SESSION

Utica, N. Y., Nov. 24.—A conference of executives and district managers of the American-La France and Foamite Corporation, Utica, has just been held here, and the various phases of marketing the motorized fire apparatus produced by the firm were discussed. C. P. Smith, sales manager, was in charge of the session. Demonstrations of several new products recently placed on the market were given. It was announced that profits for the year up to November from the sale of fire apparatus, generators and sundry sales had shown a large gain over last year's mark, with the possibility that the year will be one of the best ever experienced.

CANADIAN CONNECTICUT MILL TO DECIDE ON TOTAL PRICE

Boston, Mass., Nov. 24.—Stockholders of Canadian Connecticut Cotton Mills will hold a special meeting immediately following the annual meeting on November 27, to vote on the total price to be paid for the company's property and inventories by Dominion Textile Company, Ltd., interests. Price of $1,875,000 has been agreed upon for plant, machinery and buildings. Inventories, listed as of November 10, will be priced at the coming meeting. Acceptance of the total price will mean liquidation for the Canadian Connecticut Company.

LUDLUM STEEL CO. NET FOR NINE MONTHS $413,280

New York, Nov. 24.—Ludlum Steel Company reports for nine months ended September 30, 1928, net income of $413,280 after interest, depreciation and Federal taxes, equivalent to $3.05 a share earned on 135,000 shares of no-par stock. This compares with 200,678, or $1.48 a share, in the first nine months of 1927.

U. S. RUBBER CO. ISSUES WARNING TO PROTECT DEALERS FROM GYPS

New York, Nov. 24.—The United States Rubber Company has issued the following warning:—

"The operations of the tire peddlers who have been selling fraudulent tires from trucks have been successfully checked for the time being by the conviction and sentencing to the workhouse of two of the peddlers operating in New York city.

"The United States Rubber Company, in an effort to protect car owners and legitimate tire dealers, when it found that many of the fraudulent tires that were being sold were represented to be United States Royal Cords, joined vigorously with the district attorney's office in the collection of evidence in the two cases. The company warns motorists that the fraud is likely to reappear at any time, and that car owners will do well to buy their tires from legitimate dealers and fight shy of bargains offered by unknown persons.

"The United States Rubber Company believes the public, the tire industry and tire dealers will join with it in expressing its thanks to those defrauded witnesses who, realizing their public duty, gave their time and energy to the successful prosecution of these frauds to conviction."

SEIBERLING DECLARES $1 COMMON DIVIDEND

Cleveland, Nov. 24. — Seiberling Rubber Company declared dividend of $1 on the common, payable December 15 to stock of record November 26. The last previous dividend on the common was $1, paid December 15 last year.

Profit for year ended October 31, 1928, was $876,716 before depreciation and taxes. In previous year company reported for ten months ended October 31 profit of $1,385,282 before depreciation and taxes. Sales for the year totaled $16,329,111; in ten months ended October 31, 1927, sales were $12,367,144.

F. A. Seiberling, president, said:—"Our unit sales this year showed 40 per cent. increase, a record unequaled in the tire industry. Seiberling during the year added 2,000 new dealers and is now represented in 42 foreign countries. Factory additions started last year have been completed and the entire plant is working three shifts daily."

PROFITS GAIN 50% FOR DOEHLER DIE CASTING CO.

New York, Nov. 24.—The Doehler Die Casting Company reports a profit of $540,160 for the nine months ended September 30, 1928, before provision for Federal income taxes, an increase of more than 50 per cent., compared with $353,397 for the corresponding period of 1927.

Formal announcement is made of the purchase by the Doehler Die Casting Company of the business of the Metal Mold Casting Company of Buffalo, together with removal of production from the Buffalo factory to the Doehler plant in Batavia.

PIERCE-ARROW EXPORTS SHOW GAIN OVER 1927

Buffalo, N. Y., Nov. 24.—Pierce-Arrow exports for the present year show a decided gain over the previous year, according to the passenger car sales department of the factory here.

Exports to Holland, Japan, South America and Switzerland were, in some cases, 400 per cent. greater than any previous year. A number of new territories were opened up during the present year, including Portugal, Porto Rico, Panama and Rumania. Truck shipments to Russia were especially heavy during the year, the Fleet-Arrow Commercial car finding great favor in that country. Australia, the Argentine, Brazil, England, Finland, Germany, Guatemala, the Philippines, Spain and Venezuela bought heavily during the year.

HUDSON MOTOR DECLARES REGULAR $1.25 DIVIDEND

Detroit, Mich., Nov. 24.—Hudson Motor Car Company directors today declared a regular dividend of $1.25 per share, payable January 2, 1929, to stockholders of record at the close of business December 11, 1928.

Fields Appoints De Soto and Dodge Sales Executives

Detroit, Nov. 24.—John R. Lee, for the last several years sales manager of Dodge Brothers, has been made assistant to J. E. Fields, vice-

C. W. Matheson

Le Roy G. Peed

president in charge of sales for all divisions of the Chrysler Corporation.

Charles W. Matheson, vice-president in charge of sales for De Soto, has been made general sales manager of Dodge Brothers, returning to active direction of the sales organization that he headed for several years.

Le Roy G. Peed, who recently joined the executive staff of the Chrysler Corporation, has been made general sales manager for De Soto. These three appointments were made public today by Mr. Fields.

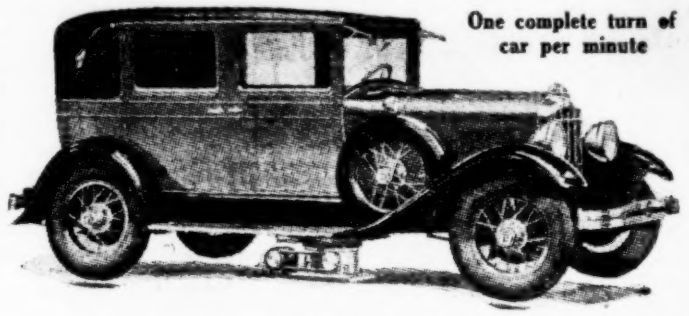
BAY STATE AROUSED OVER NEW INSURANCE RATES

Boston, Nov. 24.—Legal battles have been precipitated by the promulgation of the new automobile personal liability insurance rates Saturday, and no less than five separate actions in court and at the State House have been started. Various interested parties are taking the fight into the state Supreme Court, and others are preparing to make a fight in the Legislature for either a repeal of the law or a considerable modification of its terms.

President George W. Goode of the Boston Automobile Club has wired an appeal to the American Automobile Association at Washington, requesting that it intervene here on behalf of Massachusetts car owners to test the legality of the increased rates. Car owners have been asked to contribute to a fund to employ competent counsel and experts to fight the rates in court and in the Legislature.

Make More Car and Truck Sales with Moving Display

FARIS AUTOMATIC SHOWMAN



One complete turn of car per minute

For Dealers—Distributors—Exhibitors

THIS device, almost unseen on the showroom floor, moves the car around slowly in a circle, giving the prospect a view from every angle. Lets him see both sides, the trunk, the lamps, the radiator, gives him every view of car he wants, and silently make a sale. Saves time and money and salesman's time.

Requires only a few minutes to install and put in operation. Simply lock axles to frame of car with the adjustable spring clamps furnished with the machine, jack up the car and slide the Faris Automatic Showman under it, adjust jacks under frame, attach cord to the light socket, and turn on the current.

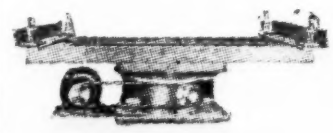
Costs about as much to operate as an ordinary electric fan.

ONLY DEVICE OF ITS KIND

Supplies a long felt need for the proper display of automobiles and motor trucks. It is the only machine of its type on the market. Adjustable, portable, electrically operated, noiseless, operates in oil and will run continuously without any effort.

A change of the model displayed can be made in a few minutes, which makes it easy to exhibit all the cars in your line at frequent intervals.

The Faris Automatic Showman is portable, occupies no extra floor space, and can be moved from one part of the building or salesroom to another in a few minutes.



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In reference to our opinion of Automotive Daily News, I find I am reading fewer trade journals, with exception of those dealing in technicalities, because I get a pretty complete, immediate picture of all that is going on in the motor car industry.

In other words, your quick, daily extract of real live motor car news shortens my business reading and still I feel I am not missing anything.

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"We look forward to receiving the Automotive Daily News at all times."

DAVID C. ROCKMAN, Asst. Treasurer,
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We are very pleased to give you an expression of our opinion of the Automotive Daily News.

We feel that this is a valuable piece of information, and in many cases we have adopted certain ideas that were given.

In one case particularly, we have saved every copy written regarding wholesalers adopting machine shop methods. We are about to install a machine shop in our main store and also in our branches, and as we have said before, we benefit greatly by the various editorials you have written regarding this matter.

We look forward to receiving the Automotive Daily News at all times.

"As necessary as new machinery."

J. W. SCOTT, Manager,
GENERAL AUTO PARTS CO.
Kansas City, Mo.

The Automotive Daily News is to us in keeping abreast with the times as new machinery and equipment is to the productive end of the automotive industry.

". . . It is an excellent advertising medium."

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ADVERTISING IS THE POWER OF AN IDEA MULTIPLIED

November 12, 1928

Mr. H. A. Tarantous,
Business Manager,
Automotive Daily News,
New York, N. Y.

Dear Harry:

Automotive News has filled a crying want brought about by the speed of the automotive industry which demands that keyed-to-the-minute information be disseminated about its products, its distribution, its progressive reactions to public trends.

The policy that makes Automotive News vital editorially is the very thing that makes it a sound and unique advertising medium.

Sincerely,

Frank J. Mooney

D'ARCY ADVERTISING COMPANY

"I enjoy reading it and look forward to it every time."

STANLEY G. WARGECHA,
Pres. and Treas.,
EAST HAMPTON MOTOR SALES, Inc.
East Hampton, Conn.

The Automotive Daily News is the best paper in its field that I read. I enjoy reading it, and look forward to it every time. It keeps me "up" in the automotive industry.

"We get a number of inquiries from our small 'ads.'"

PAUL S. LEWIS, President,
SHERMAN MOTOR PRODUCTS, Inc.
New York City.

Our opinion of Automotive Daily News as an advertising medium is reflected in our willingness to have the reprints of our "ad" imprinted "Reprint from Automotive Daily News." We get a number of direct inquiries from our small "ads" and feel sure that your paper is bringing us to the attention of the trade, and we were glad to arrange to call our last "ad" to the attention of our customers and prospective customers as evidence of the fact that we were using Automotive Daily News.

"Any one who does not subscribe to your Automotive Daily News certainly is passing up some very valuable information."

NORMAN H. HAUK, Sec'y-Treas.
THE ERIE AUTO SUPPLY CO.
Sandusky, Ohio.

We have been receiving the Automotive Daily News as a subscriber for the past year or more and have found same to be of great value in our line of business, as we have received information from this paper that otherwise would more than likely be overlooked in the general line of newspapers.

Furthermore, the automotive news in the paper is published prior to other publications. For any one who is connected with the automobile business in any manner and who does not subscribe to your Automotive Daily News certainly is passing up some very valuable information.

We hope you will continue the good work in your publication, as we read it as regularly as our daily mails.

For reader interest no publication excels Automotive Daily News. The highest grade merchants in the industry, manufacturing executives—jobbers—pay $12 per year to subscribe. Reach these men of importance at any time in Automotive Daily News. A very appropriate starting time is the Show period, when a big bonus circulation is given.

250,000 Distribution During Both Show Weeks

NEW YORK SHOW ISSUES: Closing Time* for Advertising Copy	CHICAGO SHOW ISSUES: Closing Time* for Advertising Copy
Jan. 7—Jan. 5, 9 A. M.	Jan. 28—Jan. 26, 9 A. M.
Jan. 8—Jan. 7, 9 A. M.	Jan. 29—Jan. 28, 9 A. M.
Jan. 9—Jan. 8, 9 A. M.	Jan. 30—Jan. 29, 9 A. M.
Jan. 10—Jan. 9, 9 A. M.	Jan. 31—Jan. 30, 9 A. M.
Jan. 11—Jan. 10, 9 A. M.	Feb. 1—Jan. 31, 9 A. M.

*Prior notice must be given and complete plate or mat must be in our hands by time specified.

If copy must be set, one additional day is needed.
Color and rotogravure forms close two weeks prior to date of publication.

Automotive Daily News

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J. Edward Schipper, Eastern Manager, Graybar Building, New York

BOSTON OFFICE: Metz B. Hayes, Mgr., Little Building, Boston, Mass.

PACIFIC COAST: Blanchard, Nichols & Coleman, Am. Nat. Bank Building, San Francisco, Cal.